FEBRUARY, 1957

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# IN THIS SPECIAL NATIONAL ENGINEERS' WEEK ISSUE . . .

## Three Outstanding Engineers Discuss "Engineering . . . America's Great Resource"

Secretary Wormser

E. Wormser
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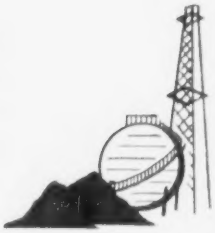
Mr. Lasky



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All Regular Features and Latest
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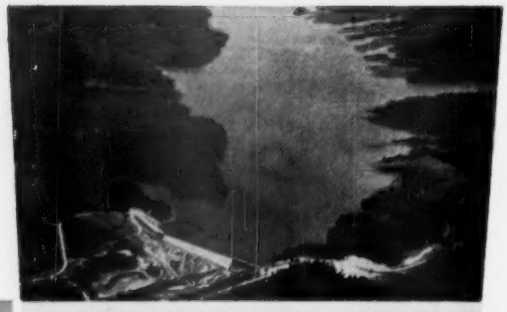
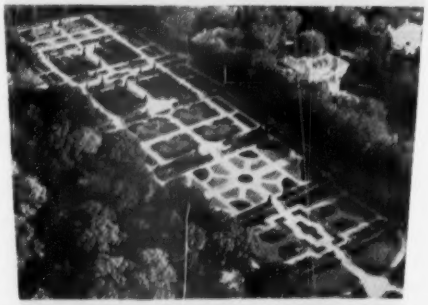
# ENGINEERS... DESIGNERS...





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*(Circle 1 on Inside Back Cover)*

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FEBRUARY

1957

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*". . . a nation's honor is bound up in its complete achievement. Over its progress the nations of the world, watching with eyes of envy, themselves having been denied the opportunity, will stand as judge."*

—President GEORGE WASHINGTON in a letter concerning the creation of a Federal capital city in the District of Columbia

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## ●SPECIAL ARTICLES

Special National Engineers' Week Messages from President Eisenhower and NSPE President Robert J. Rhinehart, P. E. . . . . 13 and 15

—SPECIAL ISSUE FEATURE—

Minerals . . . the engineer . . . the future
By Felix E. Wormser, Assistant Secretary of the Interior Department . . . . . 17

Fuels . . . the engineer . . . the future
By S. G. Lasky, Technical Review Staff, Department of the Interior . . . . . 21

Energy . . . the engineer . . . the future
By W. Kenneth Davis, Director, Division of Reactor Development, Atomic Energy Commission 25

Washington Has Living Monument in Capital City . . . . . 31

An AE Special Report Re: Impact of Science on Social Forces . . . . . 37

Professional Engineers' Buyers Guide . . . . . 41

A Listing of the Registration Boards . . . . . 51

## ●REGULAR FEATURES

Letters . . . . . 4
Professional News Briefs . . . . . 6
From Washington . . . . . 29
Engineering Employment Practices Digest . . . . . 39
NSPE Believes . . . . . 52
With Our Members . . . . . 54
With The Auxiliaries . . . . . 55
Strictly Business . . . . . 61

Advertiser's Index . . . . . 50
New Processes . . . . . 53
Professional Directory . . . . . 56, 57, 58, 59, 60
New Literature . . . . . 63
Classified . . . . . 62
What's New—New Products of Interest 64

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"How can one forcefully bring himself to the attention of management?"

"Is there really any short-cut to success?"

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Many a man wakes up with a start in his thirties or forties to find that his income has leveled off, and that promotions have ceased.

"I'm not getting ahead as fast as I should," he says to himself. "Where am I going to be ten years from now?" Why does this pathetic pattern appear in so many promising careers?

The answer is simple: Sheer ability and energy can carry a man to the mid-way point in business . . . *but only a thorough knowledge of business fundamentals can help him beyond that point.*

If you realize that fact while time is still on your side—and act on it—*you can succeed while you're still young.*

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# Letters

## *Recognition . . .*

Dear Editor:

From time to time I read in the AMERICAN ENGINEER letters or articles on how to gain more recognition for professional engineers; how to restrict the use of the term "engineers," etc. My humble and "uneducated" opinion, based on fifty years experience in the business, is that if less worrying is done about names and recognition and more about making oneself worthy of recognition, that recognition will come of itself. . . .

If you know your business and can "do your stuff," you don't have to worry about the "recognition"—that just naturally follows. That has been my experience.

FRANK L. WADSWORTH, P.E.,
Dresden, N. Y.

## *Shortage Propaganda? . . .*

Dear Editor:

The letter in the December issue, published under the heading "Answer?" has jarred loose . . . some dormant ideas just now clamoring for expression. Concerning all the ballyhooing which has been done . . . for a possible surge into engineering (by unsuspecting youngsters rallying as though patriotically, of course), till surpluses may glut the market and again the loudspeakers (will) blare out, "Engineers? Why they're a dime a dozen!" . . .

I've found a thirty cent booklet quite an eye opener. . . . Readers might be enlightened a bit as I believe I have, by taping three dimes onto a letter to M. F. A., P.O. Box 327, Gresham, Oregon, and requesting the booklet, *What Everybody Should Know About Propaganda — How and Why It Works*, by Clyde R. Miller. It is a bit of Americana, or American free press information which is in no manner subversive nor esoteric, assuredly.

MANLEY B. MONSEN, P.E.,
Eau Claire, Wis.

## *Sub-professional Work . . .*

Dear Editor:

The design engineer of yesterday was required to do a quite different type of work than he does today. He did a lot more engineering than the design engineer of today. Why is this so?

The so-called inefficiency in the use of the engineer today may be due to the phenomenon of high labor costs. Contrary to the opinion of most design engineers, the contractor seeks perfection in his work as much as is possible. He wants to be proud of his work. He wants that unique satisfaction of the man who has created something from the rough materials of nature. Similarly, the craftsmen working for the contractor seem to be one in the same mind—that is, the creation of beauty.

Why is it that contractors do second rate work in some cases? Why the need for watching to see that specifications are met? Why the lack of trust between contractor and engineer and/or architect?

*(Continued on page 62)*

*Left to Right:* Main Research Building, Service Building, Manufacturing Development Building (behind water tower), Engineering Building, Styling Building and Styling Auditorium Dome facing 22-acre lake, focal point of GM Technical Center.

# At this vast GM Technical Center we welcome the challenge of the future

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As such, through Research, Engineering and Styling it helps make next year's automobiles, home appliances, Diesel engines and our other products better than this year's models.

Beyond that, at the Technical Center men of inquiring minds are delving into the unknown in search of new materials, new forces, new techniques that will maintain America's technological leadership for generations to come.

Here scientists are rearranging molecules and repatterning alloys to produce sturdier metals, more efficient lubricants, more powerful fuels.

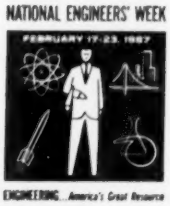
Here engineers are experimenting with ways and means of adapting these discoveries to the production of more useful things for the public.

Here stylists are plotting new designs that will insure greater beauty, comfort and convenience in the shape of things to come.

And the horizons of the Technical Center stretch far beyond the motor vehicle. It has already developed the first successful mechanical heart, a new Centri-Filmer for purifying vaccines, and is engaged in many important humanitarian projects.

Thus equipped, General Motors welcomes the challenge of the future. We hope to open new fields of knowledge that will help to build an even more dynamic and prosperous national economy — and attract more and more young people to technical careers.

*in technical progress*




# GENERAL MOTORS

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*(Circle 3 on Inside Back Cover)*

# PROFESSIONAL NEWS IN CAPSULE FORM

*A Roundup of Late Events for Professional Engineers*

### *IBM Publishes Quarterly Scientific Magazine*

A new scientific magazine, *The IBM Journal of Research and Development*, is being published quarterly by the International Business Machines Corporation. The first issue appeared in January.

Purposes of the *Journal* are to publish original work by IBM scientists and engineers for the largest possible audience of interested technical people, and to help promote more rapid dissemination of the scientific and technical information within American industry and throughout the world.

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### *Consultor Group Formed At Manhattan College*

Civil engineering development plans at Manhattan College moved a step ahead recently when Dr. David B. Steinman named a three-man consultor group.

Dr. Steinman's co-workers will be Walter G. Bain, vice president of Republic Aviation Corporation; Major General Hugh J. Casey, assistant to the chairman of the board of Schenley Industries, and Emil H. Praeger, educator and consulting engineer.

The college's consultors on civil engineering are the first full formed part of a 35-man council on engineering affairs headed by Charles E. Wilson, former president of General Electric Company.

The purpose of the full group is to help direct administrative thinking on all questions relating to the development of engineering and to form a consulting link between industry and engineering education. Consultor groups will also be formed in electrical, nuclear, mechanical and industrial engineering and corporate affairs.

"We have a tough tooling problem to work out on your order, Mr. Swanson. But no job is too complicated for our engineers."

### *National Symposium Set For Philadelphia In April*

The National Symposium on Telemetering and Exhibits will be held April 14-16 at the new Sheraton Hotel in Philadelphia, Pa. The conference will be sponsored by the Professional Group on Telemetry and Remote Control of the Institute of Radio Engineers.

For the first time five Honorariums of $250 each will be awarded for the most significant professional paper in various categories. Additional information on the technical program can be secured from A. S. Westneat, Jr., Applied Science Corp. of Princeton, Box 44, Princeton, N. J.


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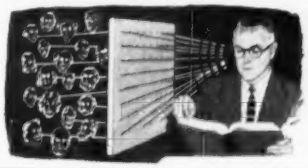

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### *Tool Engineers Establish Eli Whitney Lecture Series*

The American Society of Tool Engineers has announced the establishment of an annual Eli Whitney Memorial Lecture Series in commemoration of Eli Whitney.

Each year the honor of delivering the Eli Whitney Memorial Lecture will be awarded to an outstanding contributor to industrial progress who has "demonstrated superiority in the quality of achievement and caliber of professional service in applying knowledge of the science of tool engineering to the needs of industry."

First to be honored in this series is Louis F. Polk, vice president of Bendix Aviation Corporation and president of the Bendix Sheffield Division, Dayton, Ohio, who will deliver the initial lecture in March at ASTE's Silver Anniversary observance.

This annual award will not be restricted to ASTE members alone, but will be given to the American who best exemplifies the criteria already set by Eli Whitney.

Mr. Polk was responsible for his company's establishment of the Eli Whitney Metrology Laboratory, which provides industry and government with highly precise measurement and inspection services.

### *Openings For Engineers In Defense Installations*

Engineers with extensive experience in the operation and maintenance of complex utilities systems are needed by the Air Defense Command at salaries ranging from $7,035 to $8,645 a year. The openings are at electronic air defense installations in the northeastern and north central parts of the country.

The power, heat, and air conditioning equipment in these installations is large and complex. It includes diesel generating equipment operated in parallel, power plant switch gear equipment, high pressure fire tube steam boilers with associated equipment, refrigeration and air conditioning equipment of over one hundred ton capacity, and other complicated equipment used in heating, ventilating and controls systems.

These installations are part of the electronic Semi-Automatic Ground Environment (SAGE) System developed by the Lincoln Laboratory of the Massachusetts Institute of Technology under contract with the United States Air Force.

Inquiries about these positions should be directed to Headquarters, Air Defense Command, Colorado Springs, Colo.

### *Dr. Barthel Elected Pres. '57 Electronics Conference*

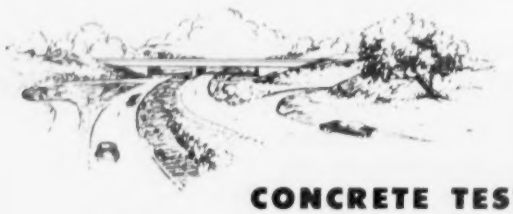
Dr. Christopher E. Barthel, Jr., assistant director of Armour Foundation of Illinois Institute of Technology, has been elected president of the National Electronics Conference for 1957.

Other officers named for the 1957 conference—to be held October 7-9 at the Hotel Sherman in Chicago—are:

Chairman of the board, Howard H. Brauer, Bell and Howell Co.; executive vice president, Joseph H. Enenbach, Illinois Bell Telephone Co.; secretary, John S. Powers, Bell and Howell Co.; treasurer, Charles W. McMullen, Northwestern University; executive secretary, Gordon J. Argall, De Vry Technical Institute; legal advisor, Alois W. Graf, Graf, Nierman and Burmeister, and assistant treasurer, James H. Kogen, Askania Regulator Co.

The National Electronics Conference, the nation's leading forum on electronic research, development, and application, has been held annually in Chicago since 1945.

The 1956 conference was attended by 9,252 persons—mostly scientists, engineers, educators, manufacturers, government officials, and students.

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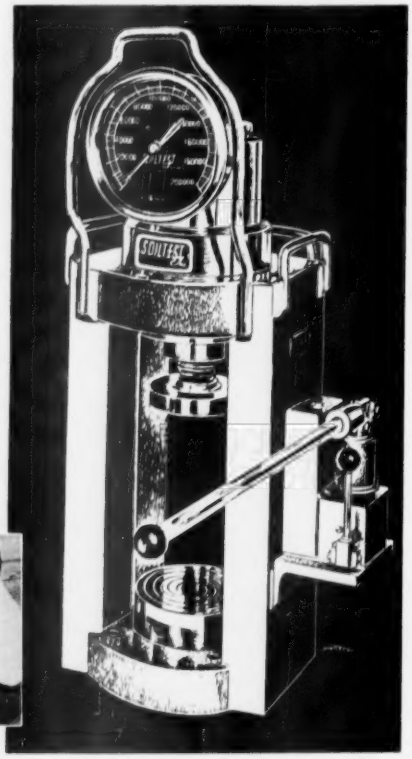


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NATIONAL ENGINEERS' WEEK
FEBRUARY 17-23, 1957

ENGINEERING...America's Great Resource

In a world where understanding is the only hope,

it is needful that we pay tribute to the engineer. To the man. Not his muscle of

machines and minerals, not the might of the atom or industry. But more his

knowledge, his compassion, his humility . . . more his mind and attitude

that are our building stone for progress in peace.

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*(Circle 8 on Inside Back Cover)*

### *"Tamed" Reactors At Nuclear Congress*

Descriptions of "tamed" reactors for college classrooms and laboratories—in a session sponsored by the American Society for Engineering Education—will be a highlight of the 1957 Nuclear Congress to be held March 11 through 15 at Convention Hall, Philadelphia.

This session, one of the first comprehensive reviews of laboratory equipment for teaching nuclear technology, is designed to help engineering schools provide the laboratory facilities which they must have to meet the growing demand for nuclear engineers.

Four reactors and two laboratory programs will be described at the session, scheduled for 2:30 p.m. on Monday, March 11, 1957, in Philadelphia: "The Water Boiler as an Instructional Tool," by Professor Clifford K. Beck of North Carolina State College and the Atomic Energy Commission. "Educational Uses of the Small Five-Watt Laboratory Reactor," by Dr. John W. Flora of Atomics International.

"The Portable Polyethylene-Moderated Training and Research Reactor," by Dr. A. T. Biehl and Dr. R. A. Fayram of Aero-jet General Nucleonics. "The Thermal Test Reactor," by Dr. H. B. Stewart and Dr. J. B. Gavin of the Knolls Atomic Power Laboratory.

"Reactor Experiments at the Oak Ridge School of Reactor Technology," by Dr. Herbert Pomerance of the Oak Ridge School.

"Reactor Experiments at the International School of Nuclear Science and Engineering," by Dr. Harry Bryant, Dr. R. H. Armstrong, Dr. D. H. Lennox, and Dr. Bernard I. Spinrad of the Argonne National Laboratory.

### *Sanitary Engineering Conference Planned*

A Sanitary Engineering Conference on Solids Handling and Anaerobic Digestion will be held at Manhattan College, New York City, on April 24, 25, and 26. Leaders in the field will present thirty papers reviewing latest advances in sedimentation and flotation of solids, chemical conditioning and vacuum filtration of sludges, and anaerobic digestion of domestic and industrial wastes and sludges.

This is the second conference on waste treatment processes sponsored by Manhattan College. Proceedings of the first conference held in 1955, *Biological Treatment of Sewage and Industrial Wastes*, are available from Reinhold Publishing Corporation, New York City.

### *1957 Nuclear Congress Scheduled March 11-15*

The 1957 Nuclear Congress, described as "possibly the most significant event of its kind ever held in this country" is scheduled for Philadelphia Convention Hall, March 11-15.

The Congress is sponsored by more than twenty engineering and technical societies and will include a concentrated program of more than 200 technical papers, two days of Conferences for business executives interested in atomic energy, and an International Atomic Exposition where new developments related to peacetime nuclear operations will be displayed.

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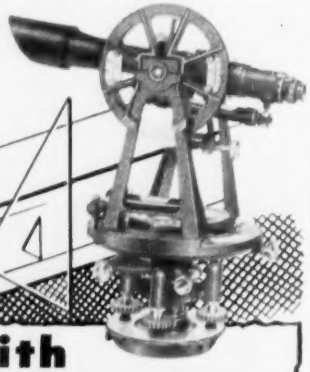

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### *American Society of Heating And Air-Conditioning Engineers Meet Feb. 25-28*

The presentation of thirteen papers and the discussions at two symposiums will provide valuable technical information for those attending the 63rd annual meeting of the American Society of Heating and Air-Conditioning Engineers at Chicago, Ill., February 25-28. Registration, sessions, and most committee meetings will be held in the Conrad Hilton Hotel.

Simultaneously with the opening of the annual meeting the 13th International Heating and Air-Conditioning Exposition will take place in the International Amphitheatre under the auspices of ASHAE and the management of the International Exposition Company.

According to Society President John W. James, Chicago, Ill., it is expected that both the annual meeting and exposition will attract the largest attendance in the history of the Society.

In advance of the technical sessions, beginning on Saturday, February 23, many of the Society committees have scheduled meetings relative to their own particular activities.

### *High School Preparation For College Called 'Tragic' By AIEE President*

The gap between high school training and college entrance requirements in this country is acute and tragic, M. S. Coover, president of the American Institute of Electrical Engineers, declared in an address at the opening general session in New York of the 1957 winter meeting of the Institute in January.

"It seems incredible that we can think of continuing to have a well-integrated system in America without taking immediate steps" to reduce this gap, he said.

Fundamental revision must take place in all curriculums in science and engineering, particularly at the undergraduate level in our colleges and universities, and it is time to break with tradition and eliminate vocational types of courses which belong to technical programs, said Coover, an NSPE member.

### *Profession Attractive But Survey Shows Gap In Management-Engineer Relations*

Although a majority of engineers find their profession more attractive than it was ten or fifteen years ago, there is room for improvement of their relations with management, results of a recent survey indicate. A majority of those surveyed said that they are given too much routine work, their pay is not high enough in comparison with others of the same or less ability, and they are not kept informed of company policy.

The survey of 300 persons in the larger corporations in the country was made by Opinion Research Corporation, Princeton, N. J. The survey also showed that the vast majority do not need or want a union to represent them. A majority also expressed the opinion that a union or similar association is not in keeping with the nature of the profession.

### *Du Pont Co. Announces Annual Grants To Schools For Next Academic Year*

A fund of more than $1,000,000 for grants to 122 universities and colleges in its annual program of aid to education has been announced by the Du Pont Company, Wilmington, Del. This support, which is for the next academic year, is a substantial increase over the $900,000 in gifts made for this year.

Nearly all of the increase and more than half of the entire program are for the improvement of teaching in universities, colleges, and high schools. The grants will support science and mathematics as well as other subjects.

The growth of the Du Pont program, as well as the change in emphasis, reflects the changing needs of the schools. At the same time, grants for fellowships in science, which once made up the entire program, and for fundamental research are being continued. Du Pont's aid-to-education program dates from 1918.

A major problem brought on by the increasing student population at all levels is to maintain high quality of teaching and at the same time develop enough teachers. The largest share of Du Pont's grants is designed to assist educational institutions in meeting this situation.



### *National Science Youth Day Celebration To Be Held On Edison's Birthday, Feb. 11*

A National Science Youth Day to teach high school students about modern careers in science and engineering will be inaugurated on the 110th anniversary of Thomas Edison's birth—February 11. Charles F. Kettering, president of the Edison Foundation, has announced that American industry and education will cooperate in the National Edison Birthday Celebration.

"We are urging young people to get out and meet researchers and engineers at local plants and laboratories," Kettering said. "There they can learn what scientists do, and perhaps become inspired to experiment on their own with the things at hand. We must become realistic and show youth that science is just the knowledge of things in the world in which we live."

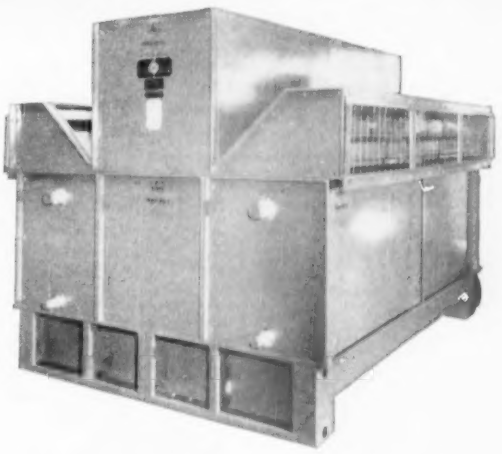
Walker L. Cisler, president of the Detroit Edison Company, is chairman of the National Edison Birthday Celebration. Cisler will spearhead a national program in which industry will invite high school students and teachers for visits to local community plants and research laboratories.

Some of the activities planned by American corporations and other groups on or around National Science Youth Day are:

General Motors will invite high school students into its newly-built General Motors Technical Center to observe some of the work going on in science and engineering.

The Detroit Edison Company will sponsor meetings and visits by high school students including tours of the company's plants and special dinners.

The Ford Motor Company will print and distribute to the nation's high schools a pamphlet about the opportunities for students who prepare themselves for scientific careers.

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### *Appoint Leading Engineer To Stanford U. Faculty*

An engineer known as a leading researcher in aeronautical structures has been appointed to the Stanford University faculty, President Wallace Sterling has announced. He is Nicholas J. Hoff, professor and head of the aeronautical engineering department at Polytechnic Institute of Brooklyn.

### *Special AMA Conference Set On Atom Managing*

Industry's role in nuclear development will be highlighted at a special American Management Association conference on "Managing the Atom" at the Hotel Statler in New York City, February 7-8. Close to 300 executives from all over the country are expected to attend.

The three-day meeting will be devoted to problems involved in successful commercial applications of atomic energy. Industry's investment in atomic energy, the Government's atomic controls, hazards and insurance of private nuclear development, and industry's technical and manpower requirements will be highlighted in panel and individual presentations.

### *Symposium On Atomic Energy Held Recently*

A regional symposium on the peaceful uses of atomic energy was held in January in Puerto Rico. The symposium was attended by more than 1,200 college students, faculty members, and professional people from Puerto Rico, and a number of guests from Central and South American countries.

The symposium was sponsored by the University of Puerto Rico in cooperation with the Oak Ridge Institute on Nuclear Studies and the Atomic Energy Commission. It was arranged to provide students and faculty members with a better understanding of atomic energy developments and the potentialities of the University of Puerto Rico in nuclear energy education.

AEC Chairman Lewis L. Strauss delivered the principal address.

### *Aid To Engineer Situation: Employ HS Students*

A tiny but significant dent in the engineering and scientific manpower situation can be made by employing high school students in research laboratories, according to Dr. Harold K. Work, director of the Research Division of New York University's College of Engineering.

In an editorial in the January issue of the Division's *Engineering Research Review*, Dr. Work writes, "Today's manpower and education problems are being attacked at many levels—industry, education, and local, state, and national governments. The level of the high school student himself should be included."

He relates NYU's experience in hiring a 15-year-old Teaneck, N. J., high school junior last summer. The youth, who has a straight-A average in mathematics and science courses, performed routine duties on research projects, including some sponsored by the Air Force and the Army Office of Ordnance Research.

The boy's supervisor, Dr. Work writes, reported that he was "of substantial assistance" in preparing specimens, assisting in wave propagation experiments and static stress tests, and reducing data from oscilloscope photographic records.

### *Building Research Institute To Meet*

The Building Research Institute will hold its Sixth Annual Meeting Monday, Tuesday, and Wednesday, April 15 to 17, in the Drake Hotel in Chicago, it has been announced by William H. Scheick, executive director.

The three-day meeting will include meetings of the board of governors and several BRI committees, social events and inspection tours, a program for the ladies, and two days of technical sessions.

A complete program announcement, registration cards and hotel information will be released by the Institute early in March.

### *Ft. Detrick Engineers Form Mechanical Group*

Engineers of the Chemical Corps at Fort Detrick, Frederick, Md., have established a western Maryland group of the American Society of Mechanical Engineers. L. Dixon has been elected chairman. P. S. Reis, a member of the National Society, is chairman of the Membership Development Committee.


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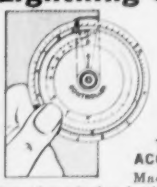

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American Engineer

*The Magazine of the Registered Professional Engineer*

VOLUME TWENTY-SEVEN NUMBER TWO

THE WHITE HOUSE
WASHINGTON

December 27, 1956

NATIONAL ENGINEERS' WEEK

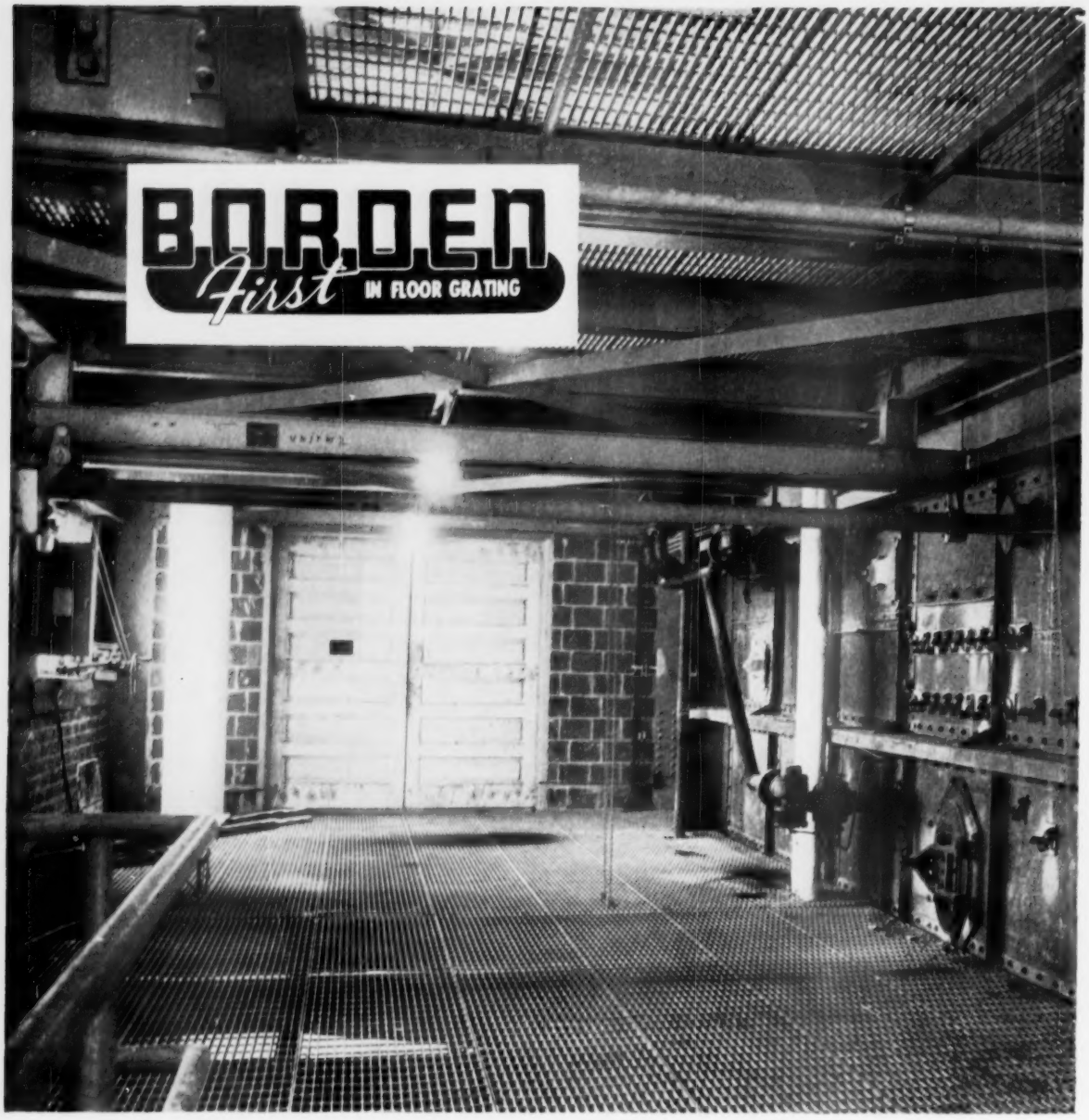
To American engineers at work everywhere in our nation and in other countries of the world, I send greetings.

During National Engineers' Week, it is an opportune time to salute the contributions made by the members of the engineering profession. At the same time, we are reminded of the impending shortages of engineers and scientists and measures being taken by the National Committee for the Development of Scientists and Engineers to meet this problem on a broad scale.

Congratulations to the National Society of Professional Engineers as it helps to alert young people to the many opportunities open in industry and research for important service to our nation and the world.

Dwight D. Eisenhower

Mr. Robert J. Rhinehart
President
National Society of Professional Engineers
2029 K Street, N. W.
Washington 6, D. C.

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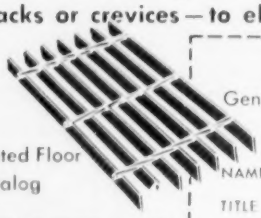

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Mr. Rhinehart

# On This—Our Seventh—National Engineers' Week

By

ROBERT J. RHINEHART, P.E.,
*President, N. S. P. E.*

THE growing acceptance of the ideas and objectives of National Engineers' Week throughout the country is indeed encouraging. Each year since the first national observance was developed has seen a steady increase in support for the Week from engineering organizations, industrial firms, the press, government officials, educators, and the general public. The 1957 Week is certainly no exception. All the indications point to the broadest and most extensive observance the profession has yet enjoyed.

The theme for the 1957 Engineers' Week—Engineering . . . America's Great Resource—is indicative of how far the engineering profession has come in this century. The theme was chosen because of the growing belief that America's most important resources are not buried in the crust of the earth, but are actually in the minds and attitudes of the people. As we look about on the international scene, it becomes clear that freedom in these years can only be preserved by nations that have an advanced and up-to-date technology. This must be true not only in the fields of military weapons, but in the whole national economy as well. The basis for such a technology is engineering knowledge and skill. Our country has such a basis.

THE communication regarding Engineers' Week from the President of the United States, which is reproduced in this issue of the AMERICAN ENGINEER, is an illustration of the recognition achieved by the engineering profession. We have had such tributes now from two Presidents. The Week has been "proclaimed" by a growing list of state governors. The response from the newspaper and magazine press has likewise grown steadily each year. The National Society has received inquiries about the Week from engineering and other organizations all over the country. From a purely public relations standpoint, our annual observance has been immensely successful.

But the officers and members of NSPE look forward to a great deal more than accomplishment in the field of public relations. The projects undertaken during National Engineers' Week form the foundation for an over-all venture in public service which will become more and more a part of an all-year program for each NSPE affiliate. Engineering has achieved the status of a profession. But the individuals who make up the group can never take their professionalism for granted. We must constantly rededicate ourselves to the ideals which put service to our fellow men as the highest objective. Let us endeavor to make this rededication during the 1957 National Engineers' Week.

R. J. Rhinehart

## *this special issue . . .*

**In keeping with the National Engineers' Week theme — "Engineering . . . America's Great Resource" — in this issue we are pleased to present the following feature articles written by three outstanding individuals highly recognized in the fields of minerals, fuels, and energy. We are all quite aware of how successfully the American professional engineer, through the years, has taken our resources and put them to work for humanity, but what of the future? How will the professional engineer of tomorrow deal with the problems that will face us in each of these critical areas? . . .**

Large-scale mining techniques and new developments in metallurgy have made possible utilization of low-grade ores, as shown by this scene at the Kennecott Copper Corporation's Chino Pit in Santa Rita, N. Mex.

Photo courtesy Kennecott Copper Corporation

The author paints an optimistic future for young people such as these shown here. He sees the "prophets of doom" wrong in their view of our future resources.

# minerals . . . the engineer . . . the future

**by Felix E. Wormser** *Assistant Secretary of the Interior*

WE are engaged these days in an important and serious argument over man's ability to continue to find enough mineral raw materials with which to keep our industrial machine running at a faster and faster pace. No one believes for a moment that suddenly some morning we shall awaken to find the steel mills stopped for lack of iron ore or the buses standing in the streets because the oil wells suddenly dried up. There are many, however, who believe that we have been skimming the cream of our mineral ores, dipping heavily into the top-milk and now have left only the low-grade skim milk, with the net result that costs of mineral raw materials must rapidly rise to be followed by a decline in living standards. The Neo-Malthusians —the prophets of doom—see the explosive growth of our population, the destruction of forests, the erosion

of farm lands and the depletion of mineral resources, as certain signs of our headlong rush to disaster. Indeed the voices of some of the Neo-Malthusians take on a quality reminiscent of the major prophets of the Old Testament, as they warn the world of the great crisis facing civilization.

The President's Materials Policy Commission, after a serious and long look at projections of United States demands for minerals and available information regarding domestic resources, had this to say: "The supplies of the evident, the cheap, and the accessible . . . are running out. The plain fact seems to be that we have skimmed the cream of our resources as we now understand them . . ."

On the other hand, there are many who believe that our mineral resources are literally inexhaustible and that with science and automation and the new technology we are on the threshold of a great new era.

The Minerals, Materials, and Fuels Economic Subcommittee of the Senate, in a report dated July 9, 1954, maintains that the assumption that the United States is a have-not nation is one of the greatest frauds and hoaxes ever perpetrated on the American people.

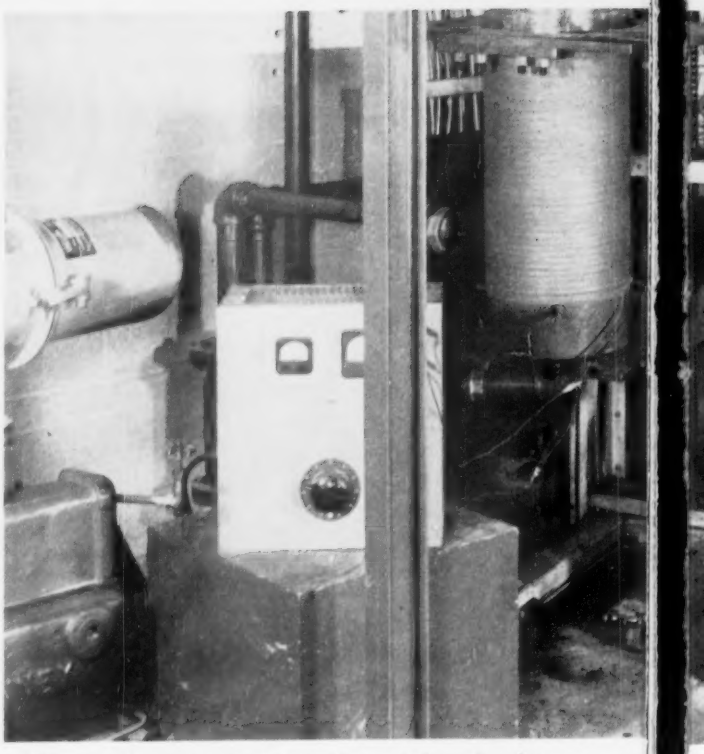
Whether one agrees with the Neo-Malthusians who see only doom ahead, or with the perennial optimist who sees only progress ahead, the fact remains that many of our reserves of high-grade ores have been seriously depleted and we are increasingly dependent upon imported raw materials. There is no denial of the fact that present high rates of consumption of our irreplaceable assets raise serious problems for our dynamic economy. This does not, however, justify the conclusion that the United States has become a have-not nation, that our security is threatened by our increased dependence upon foreign sources for mineral raw materials, and that we have scraped the last from the bottom of the barrel.

The United States today has more strength and diversification in its mineral-producing industries and is turning out a greater total volume of mineral raw materials than at any time in our nation's history. It will remain, however, for the future to tell which assessment of the situation proves right in the long run.

The mining and metallurgical engineer of tomorrow, assisted greatly by the geologists, will make a great contribution toward resolving this dilemma and assuring continuing supplies of essential mineral raw materials so that the advance of our civilization does not grind to a halt.

THE search for new mineral deposits is becoming increasingly a scientific and technological problem. Itinerant prospecting methods can lo longer be relied upon to discover the deposits needed to satisfy the growing requirements of the mineral-using industries. Prospecting has come more and more to mean the search for hidden deposits. This calls for the application of the earth sciences —geology, geophysics and geochemistry, for mineral deposits are geological entities and knowledge of where and how to search for them can best be attained through a thorough understanding of favorable geologic ages, characteristic structures, and other information to suggest where and how to search.

During the last quarter of a century scientists and engineers have devoted much time, effort and money, to industrial research on new uses of minerals and on marketing. The records show that the amount spent for this type of research ran far ahead of that spent for research on discovery techniques. Despite all of the warnings of mineral depletion, many of the metal-using industries seemed for a time at least to lose sight of the fact that individual deposits of mineral raw materials of a given grade and quality are of finite quantity. Efforts to adapt minerals and metals to new uses and to create markets for



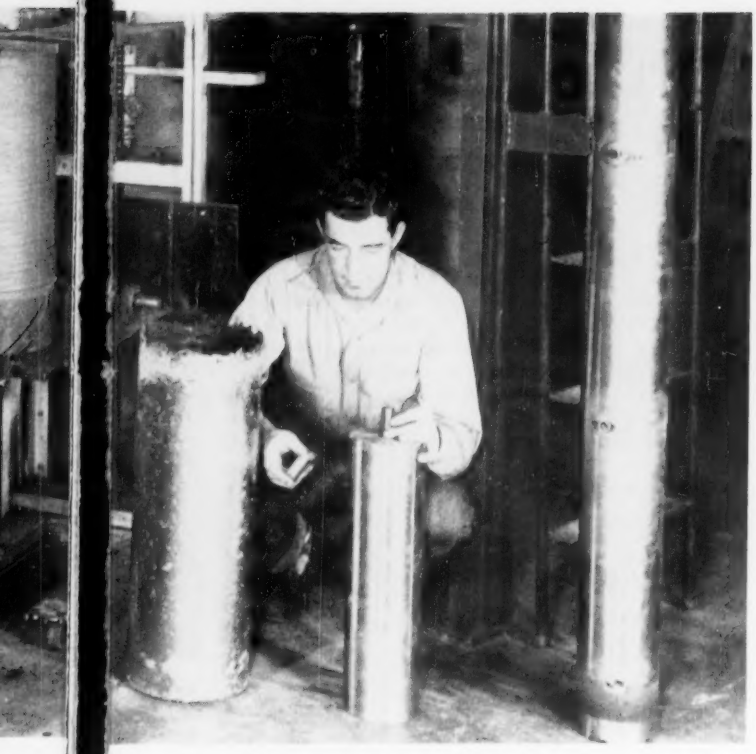
**Here are shown ingots of zirconium metal produced at the Bureau of Mines' Northwest Electrodevelopment Laboratory, Albany, Ore. Zirconium is one of the new metals**

these products have been generously supported and have met with considerable success.

In contrast, the efforts to understand the processes by which ore deposits are concentrated and to devise methods by which to discover new commercial deposits have received less emphasis. The President's Materials Policy Commission estimated that of the 135,000 scientists and engineers engaged in research in the United States, not more than 3,000, or 2.2 per cent are geologists, geochemists and geophysicists. By far a greater number of these are engaged in research in petroleum, which leaves the number available to work on minerals small indeed.

Most of the evidence available to us today would indicate that there are abundant new sources of mineral raw materials if we but learn how to find them. The evidence strongly suggests that the mineral deposits found to date are but a fraction of those that occur within accessible portions of the earth's surface. Most of the mining districts now active in the United States were originally discovered because ore cropped out at the surface. Subsequently a large number of the deposits later mined from these districts gave no surface indication of their presence but were found by careful and persistent probing of the subsurface. We look to the engineers and the scientists of tomorrow to develop new techniques and instruments for finding these. Contributions to these developments will come from several scientific fields. The use of geochemical and geophysical clues is one of the most promising fields of research.

ANOTHER important contribution engineers of tomorrow will make to a solution of our problem of mineral supply will be the development of uses for newer metals



**now being produced by American industry to meet atomic-age demands for materials with unusual properties.**

and minerals. One of the most encouraging aspects of our efforts to balance supply with requirements for mineral raw materials is the spectacular increase in the number and variety of minerals we are now using. Before the Eighteenth Century, man worked with just seven metals —gold, silver, copper, tin, lead, iron, and mercury. By 1900 the list had grown to twenty; a half century later it was over sixty, and the list is constantly growing.

No doubt every engineer is proud of the profession he represents. That is certainly true to a marked degree of mining and metallurgical engineers. They experience a peculiar satisfaction in applying their professional skills to satisfy human wants and enable our civilization to progress. Also, sadly enough, they are called on to assist in the design and application of the engines of war that still plague the world.

Mining and metallurgical engineering is often stimulated by the excitement of a discovery of new sources of mineral wealth, and in these days by the development of many mineral products formerly unavailable to commerce and industry. Indeed, it appears that the world is now entering an era when metals known to exist in plentiful amounts in the earth's crust are for the first time, figuratively speaking, being utilized by mankind.

I vividly recall visiting a few years ago the Bureau of Mines Experiment Station in Albany, Oregon, where our scientists discovered a means of producing zirconium, one of the newer metals which is proving indispensable in the construction of certain atomic reactors. In the development of the process, the zirconium was contaminated by another metal known as hafnium, and hafnium also had to be produced. Probably very few people have ever seen or know anything about hafnium and yet it happens to be more plentiful in the earth, according to geologists, than copper, lead, zinc, and many other metals. We shall hear more about it as time goes on. This is likewise true of many metals that are only now being discovered in quantities sufficiently large to make them commercially attractive. A classic illustration of this is uranium, which a few years ago was more or less a mineralogical curiosity. Look at the industry today! Uranium is being found and discovered in innumerable places and promises to be enormously useful to humanity as time goes on, not for its destructive potential, but because of its peacetime applications.

TWO years ago I stopped off on the main highway between Los Angeles and Las Vegas to look at what is probably the largest deposit of so-called rare earths in the world. It is only a stone's throw from the main highway, and for years lay undetected. Yet it is a huge deposit and may supply large amounts of cerium, lanthanum, scandium and other rare earth metals—after the engineers learn how to separate, produce and utilize them.

Then we are finding large deposits of columbium, cesium, and other metals that will prove useful. Many of these deposits look like ordinary country rock, some like granite, some like limestone, so it is no wonder that they aren't ordinarily detected, but undoubtedly you will hear more from them as time goes on. Germanium is a new metal which has found useful application in transistors; and beryllium, used in atomic energy applications as well as alloying. These are but a few of the newer developments in this interesting field, but enough to show how fascinating and exciting the present era is to the professional mining and metallurgical engineers.

Still another job to be done by the engineers of tomorrow is to develop synthetics which can be substituted when necessary for less abundant mineral commodities. To varying degrees research has led to many substitutes, but more are apparently necessary. The substitution of glass fibers for asbestos, the development of corrosion-resistant coatings for steel other than tin, the synthesis of mica and asbestos are some of the problems in this field.

As our higher grade deposits are depleted, we must find ways to utilize the large quantities of low-grade ores now available. This means we must continually improve the efficiency and effectiveness of methods of concentration. We are learning to handle much larger volumes of low-grade ores and extract sufficient quantities of useful materials from them to compete with higher-grade ores from other countries.

Research in this field has far from exhausted the possibilities. For example, irradiation of minerals during the concentrating process may result in properties on which entirely new recovery methods can be based. One of the most promising areas for study continues to be that of chemical extraction of minerals. Chemical leaching tech-

niques developed for copper, tungsten, and other ores, demonstrate the utility of such methods. If they can be properly applied to such widely distributed ore bodies as the laterites of Cuba, a major contribution will be made to our supplies of nickel, cobalt, and other scarce metals.

The advancing technology of today continually demands materials with unique properties to meet specialized requirements. The electronics, aircraft, and nuclear energy industries are prime examples of this demand for special purpose materials. Research has developed the need for and provided germanium and antimony-aluminum alloys for transistors, pure silicon for solar batteries, complex alloys for high-temperature service, zirconium and hafnium for nuclear reactor construction. Materials are needed that can withstand temperatures over 3500° C. as well as those suited for wide use in the 1500-3000° C range. Subjecting metals and nonmetals to enormous pressures, finding compounds that can make ceramic materials ductile at high temperatures and devising means of preventing oxidation of metals are possible avenues of investigation in this field.

RELATED to all of of these engineering tasks dealing specifically with metals and minerals are a number of related engineering problems. We need to find more economical means of transporting large tonnages of solid materials over long distances. We need to develop new equipment for smelting ores. We need new processes such as those involving selective adsorption of metals by membranes and chars. Mining, drilling, blasting, ventilating, and lighting, all need major improvements. It is to these tasks that many of tomorrow's engineers will devote themselves with great achievement and satisfaction.

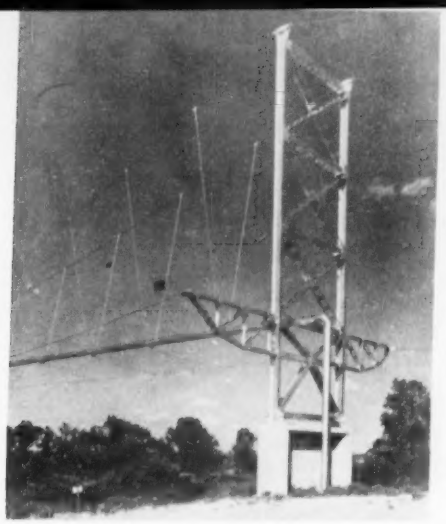
I return to the question of whether our civilization faces disaster as resources are depleted. I think the engineers will supply the answer. And from what we know now it is squarely up to them. No amount of advertising or sales promotion will conjure up new mineral deposits. No legislative enactments will guarantee a constant flow of industrial raw materials. Only as the energies of scientists and engineers are given full play will our future be secure.

I am confident they will not disappoint us.—***End.***

***(A biography of Mr. Wormser appears on page 28)***

**Crude taconite rock from Oliver Iron Mining Division's Pilotac mine near Mountain Iron, Minn., is loaded after blasting into railway dump cars for transfer to the company's nearby taconite concentrating plant. This U. S. Steel division has been working here experimentally since 1953. The taconite rock is harder than granite and contains only 25-30 per cent iron. About 2,000,000 tons of this rock must be mined annually to operate the 500,000 ton-capacity concentrating plant.**

**A dragline at work at Old Glory Mine No. 17 at Maumee Collieries in Clay County, Ind. The engineer of tomorrow will find many demands for new type equipment and processes.**



Shown is a portion of the Lone Star Gas Company's pipeline bridge across the Brazos River at Waco, Texas.

# fuels . . . the engineer . . . the future

**by S. G. Lasky**

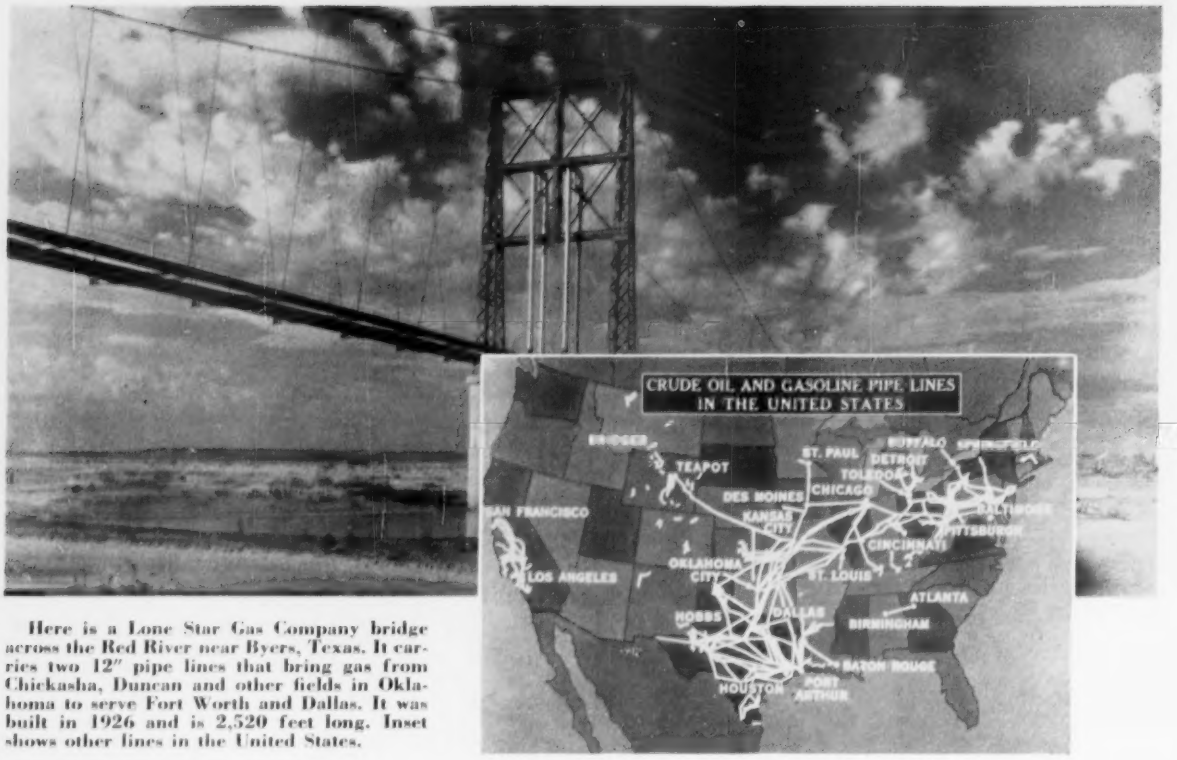
***Technical Review Staff,***
***U. S. Department of the Interior***

**Tomorrow belongs to the imaginative, the industrious, the adventurous.**

***—Kenneth A. Spencer***

At no time in past history has the average person, world-wide, been so consciously aware of the importance of fuels—fuels for heat, light, and power; as raw materials for lubricants and chemicals; as the source of coke for the reduction of iron ore. Wherever newspapers or magazines are printed—wherever radio or television is broadcast—he reads and hears of the turmoil in the Middle East and of its effect on the oil supply of Europe. He is told that nations have resorted to arms to safeguard this supply, and learns that its curtailment is so great a threat to world well-being that the United States has waived antitrust restrictions in order to permit American oil companies collectively to help make up the deficit.

The engineer, of course, is especially aware of the importance of mineral fuels, and there is no need




**Here is a Lone Star Gas Company bridge across the Red River near Byers, Texas. It carries two 12″ pipe lines that bring gas from Chickasha, Duncan and other fields in Oklahoma to serve Fort Worth and Dallas. It was built in 1926 and is 2,520 feet long. Inset shows other lines in the United States.**

to dwell upon the subject here except to remind him that in one way or another each of us is a participant in it. But in what way, really? What road does the profession follow—a broad highway through an economy of plenty, or a narrow, winding road through an economy of scarcity?

One has only to read the statistics to know how much of the several fuels we have used in the past. It is not so easy to know how much we will want in the future, and it is still more difficult to assess our ability to meet this want. If future needs are met, perforce the supply has been available, but how much from domestic mines or wells and how much from abroad? Economic trends and mineral reserves alike are subjective concepts, involving a wide range of variables and assumptions. This is particularly true of mineral reserves. For example, for the purpose of a national estimate of coal reserves, the appraiser must decide for himself such factors as the degree of certainty to be sought, whether to include the coal in seams as thin as fourteen inches, say, or to draw the line at some greater thickness, whether to allow on overburden of as little as 1,000 feet or perhaps as much as 3,000 feet, whether to assume a cost-price relationship as at present or as expected at some future date. One estimate may be several times another, yet each be true in its own context.

There is considerable disagreement as to the extent to which future demands for energy will be met by coal, but for our present purpose that fact need not trouble us. Even accepting the highest present estimate of future electric-generating capability (600 million kilowatts by 1980, as compared with 123 million kilowatts at the end of 1956), and the lowest estimate regarding introduction of atomic energy (fifty-two million kilowatts by 1980), the amount of coal minable in the United States at or near present costs and prices should last for several hundred years. There is a wide margin of error in any such estimate, but on the other hand the conclusion just expressed assumes that only half of the coal in the seams will be recovered. Moreover, additional coal will become economically recoverable in proportion as the price of coal may increase relative to the general price level.

THERE may not, in fact, be even a shortage of coke. Coke is a manufactured product, obtained by blending coals of different kinds, and the blending possibilities are almost limitless. In addition, various changes in blast furnace technology—such as greater tolerance to sulphur and increasing use of high-iron foreign ores and of high-iron taconite pellets—have the effect of stretching the available supply.

The challenge, then, is not to meet an oncoming shortage, but to make certain that coal makes its proper economic contribution amidst the welter of forces that rule its competitive position with respect to petroleum, natural gas, and, in due course, oil shale, atomic energy, and perhaps solar energy.

The coal industry has done a remarkable job in keeping the cost of production under control. It has accomplished this by mechanization. Mechanization is farther advanced in coal mining than in any other segment of the mining industry. Even so, the productivity of labor can be increased still more. The United States average in coal mining is now ten tons per man day and is still headed upward. Incidentally, the largest power shovel in the world, having a bucket that can hold seventy cubic yards, was built for coal mining. Other avenues of opportunity include recovery of a larger portion of the coal in the ground and continued improvement in the efficiency of furnaces and boilers.

But these are run-of-mine engineering obligations. The big tasks, the big opportunities, the big challenges lie elsewhere. One of them is the conversion of coal into liquid

fuels. This has been receiving industrial attention for ten years. It is now technically feasible, but the product cannot yet compete commercially with natural liquid fuels. On the other hand, the low-temperature carbonization of coal, long technically feasible, is now becoming commercially feasible as well, as outlets open up for the vast quantities of chemicals produced and for the char residue. For example, a large new power plant is being built in the coal fields of West Virginia specifically designed to be able to burn the char from a carbonizing plant being built nearby; in addition, chemicals have been developed that will fit into the market—partly developed for these very products—expected to exist when the carbonizing plant is ready to produce them.

Another bold operation is the 110-mile pipeline from southeast Ohio to Lake Erie for the hydraulic transportation of coal. It will be able to transport 1,300,000 tons a year. Longer lines of greater capacity are technically feasible. The builders of this line are savoring the thought of combining long-distance transportation with an arrangement such as that just described, whereby the pipelines would feed to carbonizing plants located alongside the power stations.

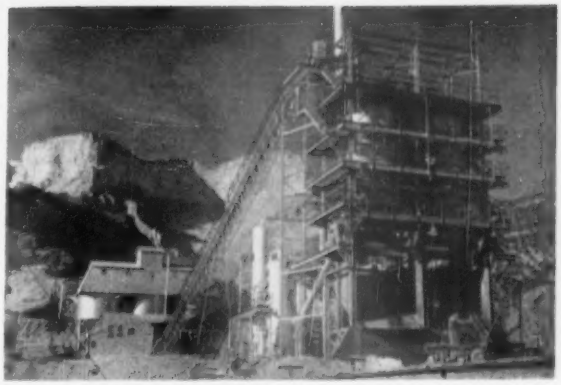
The Ohio-Lake Erie pipeline will last for twenty years. Perhaps by that time nuclear heat will be available for the gasification of coal and its conversion to synthetic liquid fuels. Test reactors already have been built using electrical energy to simulate conditions that would exist in a nuclear reactor.

OTHER imaginative minds envision the direct conversion of coal into electricity; commercial application lies well into the future, but the thought can brighten the dreams of many.

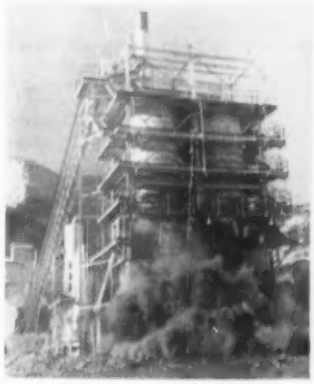
What, then, about oil, and about natural gas? The two occur in nature in the same kind of geologic environment, and all oil pools contain both. In fact, the gas is depended upon to propel the oil to the well bore and to help bring it to the surface. Originally any gas produced was a byproduct of the search for and production of oil, and it was wasted. Now a market for it is well-established as a result of the engineering development of long-distance transmission.

Last year the United States consumed about 8.5 million barrels of oil a day but produced only 7.2 million. It has been a net importer since 1948, not because of domestic inability but because of the economic availability of foreign oil. Twenty-five years from now we may want as much as fifteen to twenty million barrels a day. For gas, too, we may want about twice as much as we now use. These joint demands can be met, if not completely by domestic production then with the help of imports and, if necessary, of synthetic liquid and gaseous fuels. The quantity that will, in fact, flow from domestic wells is dependent on many factors: present reserves (working inventory, that is), the amount remaining to be discovered, the portion that can be withdrawn from the ground, and especially the rate at which the oil will be discovered, produced, and transported to the burner or other outlet.

Professional opinion differs on this subject, particularly with regard to the amount of oil that ultimately will be produced. Some petroleum people believe that a domestic production of nine to ten million barrels a day is feasible now and that this rate can be sustained for decades perhaps. Others believe that, on average, the maximum rate of domestic production will be only around eight million barrels a day and that it will be reached sometime in the middle to late '60s, but still without agreement as to whether there will be a sharp peak or a broad plateau. The effort to make up the loss of Middle East oil to Europe from the Western Hemisphere is putting these opinions to a partial test.



**A conveyor links the N-T-U retorts (foreground) and the shale storage bins (background) at the oil shale demonstration plant of the Bureau of Mines near Rifle, Colo. Sheer cliffs of oil shale in the far background form a part of the Naval oil shale reserves.** (Bureau of Mines Photo)



**Thirty-five tons of spent shale is dumped on ground at the end of run in N-T-U retort at Bureau of Mines oil-shale demonstration plant.**

The agreement is better with respect to natural gas. It appears that there should be enough for about fifty years, which gives plenty of time for the evolution of processes to manufacture gas from coal, to the extent that gas achieves a mandatory place in the economy.

The point, then, is not one of general shortages, but of making the best economic use of domestic resources, with the objective of providing better and more petroleum products at lower costs. In detail, the problems are those inherent in the economic challenge, and, broadly speaking, they are the same for both oil and gas—namely, efficient and economic drilling, production, and transportation.

In modern practice, only about four-tenths of the oil in the rock is recovered. Some engineers predict that in the future as much as ninety per cent may be recovered—recovery is as high as seventy per cent now from some pools. If so, a barrel of oil found at that time will be twice as significant as a barrel found now.

THE cost of finding and producing oil—and gas too, for that matter—is on the increase; wells have to be drilled deeper, and an increasing number of them have to be drilled. Deeper wells require stronger well casings and stronger drill pipe. Drilling methods must be constantly improved if costs are to be kept under control. A par-

**The author says that the coal industry has done a remarkable job in keeping the cost of production under control. It has accomplished this through a mechanization that is farther advanced in coal mining than in any other segment of the mining industry.**

ticular problem at the moment is to develop the most effective methods of drilling in open water in exploring the Continental Shelf, and of recovering the oil and gas found.

Along with finding and recovering more oil, there exists the problem of transporting it. With respect to gas, the most pressing problem and perhaps the most technically difficult is the development of underground storage methods to permit meeting high seasonal demands and maintaining a uniform load on long-distance transmission lines. Enterprising minds are wondering about the feasibility of liquefying natural gas for more efficient transportation and storage.

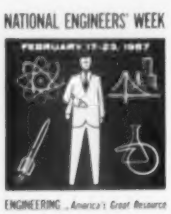
Enmeshed with all these matters, both as to cause and effect, is the attention to better engine efficiency in the utilization of fuels and lubricants.

When the competing forces so decide, oil from shale will move in to augment the supply of natural oil, and when it does it will bring with it a variety of problems in mining engineering, including disposal of the ton or more of ash produced for every barrel of oil. Our oil shales can be made to produce 500 billion barrels or more of liquid fuels. The oil is there and the basic technology of production is known: the problem is cost. In due course, as indicated above, there will be, if needed, synthetic liquid fuels from coal as well as from oil shale.

None of the problems I have described are acute in the sense that they demand attention beyond what will be forthcoming under the day-to-day spur of the country's needs and desires. The demands for energy, the ceaseless war against friction, and a lusty chemical industry assure satisfactory attention to whatever technologic issues may arise. But though the problems are not urgent, they are pervasive. Mining and petroleum engineering are not alone involved. Mechanization of coal mining is an achievement in mechanical engineering; automation in some mining operations and in oil refining is an electronics matter; proper steels for pipelines, drill pipe, and drill casing, for power shovels, and in the production of synthetic fuels from coal, depend on advanced metallurgy; the design and laying of a pipeline from Texas to California is no mean feat in civil engineering. Hydraulics and the pipeline transportation of oil and coal are inseparable, as are, of course, chemical engineering and the production of petro-chemicals.

The problems will be solved, and in good time. On the other hand, the big rewards will go to the man who has the imagination to foresee a situation before it actually emerges, the courage to move to meet it, and the energy to support his courage. Engineering is a practical profession, but even so, too fine a line can be drawn between the imaginative and the visionary.—***End.***

*(A biography of Mr. Lasky appears on page 28)*



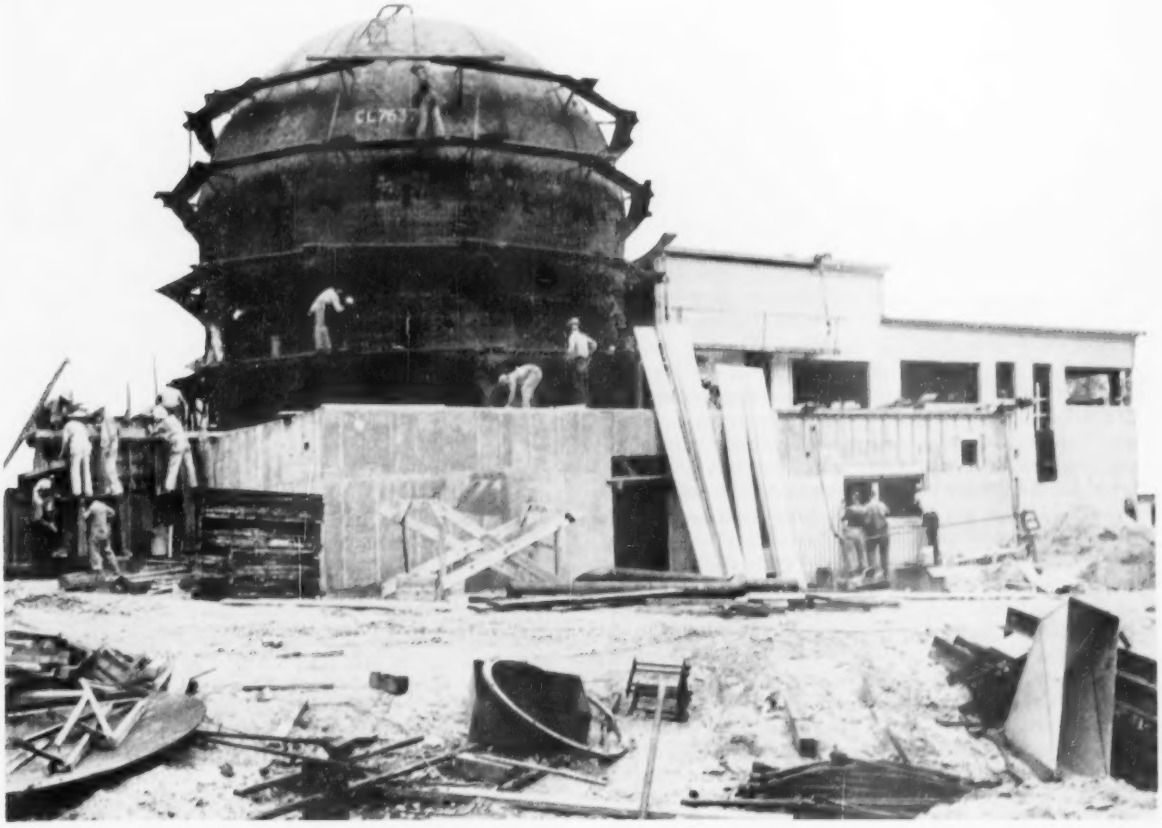
# energy... the engineer... the future

**by W. Kenneth Davis** *Director, Division of Reactor Development, Atomic Energy Commission*

THERE is a common belief that development of atomic reactors is primarily a job for nuclear physicists. This was certainly the case in the very first efforts when the emphasis was on combining fissionable materials and moderators in suitable combinations to produce a nuclear chain reaction. Thus, the first piles in the Manhattan Project were built mainly by physicists.

At the stage we have now reached, however, the shoe is on the other foot. Physicists have done a great work in providing the main outlines for this new field. Successful developments henceforth are likely to come more from advances in engineering technology than from new discoveries in physical research.

This is not to imply that the physicist is no longer needed. Nuclear power work requires a team effort



**Welders put finishing touches on steel shell for the vapor container of the Army Package Power Reactor—one of the nation's first atomic generating plants. The APPR, which ALCO Products, Inc., is building at Fort Belvoir, Va., for the Atomic Energy Commission, is expected to be in operation in 1957.**

on the part of specialists of many types, including all the branches of engineering and many branches of science, with the physicist still a very important person on the team. For example, in the search for suitable reactor materials we have found that there is a lack of knowledge of the fundamental scientific principles involved, and we have had to try to solve the problems by empirical means. Doing it this way, however, has been costly and time consuming and has been accompanied by unexpected flaws and failures. Certainly in such areas as these there is still much to be hoped for from physical science. All in all, the engineers must be in the forefront of future developments.

The requirements imposed by nuclear power development on engineering are in many ways different from anything the profession has encountered before. Let us consider some of these differences.

Most of the great new scientific developments of the past have been allowed an early period which was relatively free from economic competition or social pressure. Airplanes, automobiles, steam engines, and radios, to mention a few, all passed in more or less leisurely fashion through an initial phase of conservative rather inefficient models, which, nevertheless, served an economic purpose because they were relatively free from economic competition. The market was able to absorb these inefficient beginnings and thus finance the improvement of the arts from model to model. There was time and money for a period of trial and error, of rather gradual improvement.

The atmosphere in which the nuclear power industry is developing is quite different. Of course we expect to achieve improved models as we go along. But at the very outset, and most particularly in this country where power is produced so efficiently and at such low cost from conventional fuels, we are faced by a situation where the machines we produce can find no market at all unless they are very, very good. The free market is not anxious to subsidize awkward beginnings in this field.

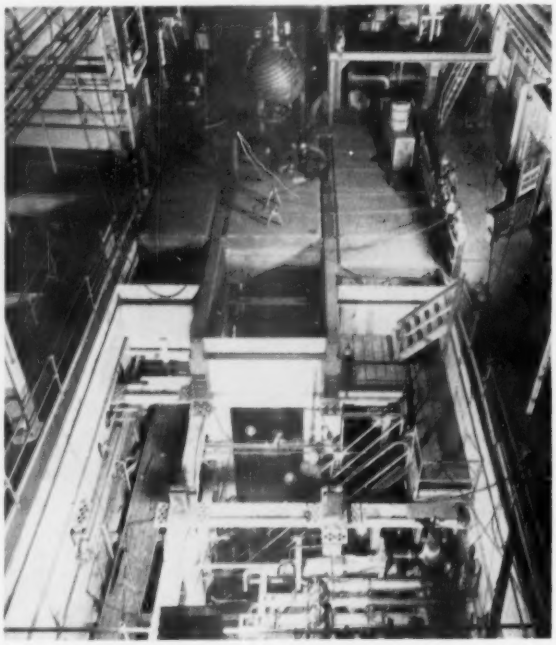
Moreover, the social and political pressures behind the development are great and urge us to make rapid progress. Thus, the time to observe, to indulge in false starts, to experiment at leisure, which some other developments have had, is not offered to us. Indeed, in some lines of attack it is literally true that we have no time to wait to see how the first model works before we must be building the second.

THIS socio-economic pressure for speed runs up against a limitation imposed by nature which argues for a slower pace. This was expressed very well five years ago by T. Keith Glennan, then an AEC commissioner, and now president of Case Institute of Technology, in these words:

> "Nature does not allow us to experiment on a small scale. Due to the critical mass consideration, an experimental reactor does not reproduce the operating conditions of the final reactor unless it is full size. It is true we have 'critical assemblies,' which are very low power prototypes of the final reactor. We also use 'mockups' which can test the performance of separate components of the reactor. But we cannot operate a reduced-scale model at a power density comparable with that required of the actual reactor, and therefore we lack a cheap and easy means to get answers on many of our design problems. This restriction, of course, places a tremendous responsibility on the reactor engineer—the responsibility of being right the first time. Correspondingly this restriction cuts down his inclination to proceed at too fast a pace."

Another distinguishing characteristic of atomic energy activities is that they are largely at this time developmental in nature. Each project tends to be individual, tailored to the particular end in view, which may be the investigation of a new concept or principle. It follows that research, development, and design constitute a much larger share in the program leading to the construction of a plant than is usually the case. Research and development costs equal to or considerably exceeding the cost of a plant are the rule rather than the exception today.

Great challenges to engineering from nuclear power development have come on the technological side. Many of these derive from the production within reactors of intense radioactivity and of pressures and temperatures not previously encountered in engineering work. To meet these challenges it has been necessary in several branches of engineering to push on to new and higher plateaus of knowledge and methodology.

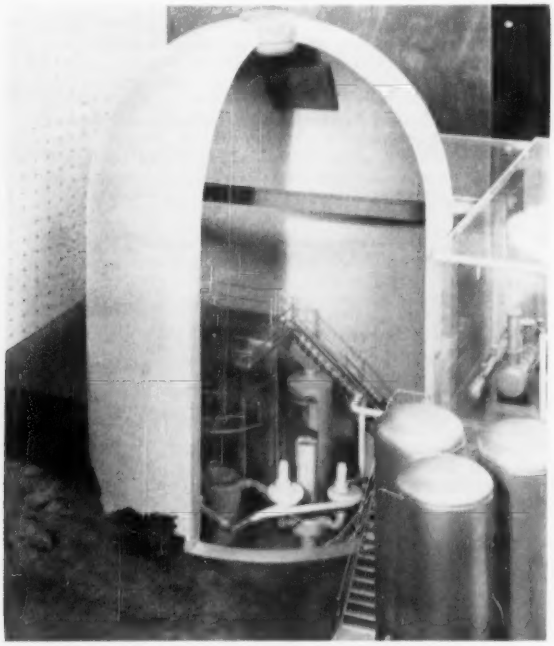


**Usual engineering materials have been found to be unsuitable for much reactor work. Shown here is the Homogeneous Reactor Experiment No. 2 at Oak Ridge, Tenn., under construction. Startup of the reactor has been delayed by stress corrosion cracking in the leak detector and high pressure systems.**

In the materials field we have found usual engineering materials to be not suitable for much reactor work. Metallurgists and metallurgical engineers have accordingly been asked to come forward with materials which will be strong enough to withstand the very great operating pressures and temperatures, which will be able to resist the effects of substances among the most erosive and corrosive ever used, which will not absorb too many neutrons, which will permit fabrication into the desired parts, and which will be cheap enough so that we can afford to use them. The relative emphasis among these qualities has of course varied with individual jobs and individual reactor parts for which the materials are needed. This problem of finding the proper materials has been met to some extent by use of hitherto relatively unknown materials such as zirconium and beryllium. To some extent the

need has not been met at all and stands athwart the path of progress in reactor development as a major obstacle.

Turning now to the field of civil engineering, we find requirements for buildings designed to prevent the escape of radiation, for concrete and steel tanks that will not leak even one drop, for sewers that will not corrode. The civil engineer has been required to handle not ordinary concrete but super-heavy concrete in which part of the aggregate is replaced with crushed barium sulphate rock and with heavy steel punchings. There have also been unprecedented construction assignments, as in the leakproof, welded-steel sphere housing the submarine prototype reactor at West Milton, New York, the largest spherical structure ever built.



**Close-up of the heart of an atomic-powered generating station model produced by ALCO Products, Inc. Shown within the specially designed vapor container are the nuclear reactor, left at edge of container shell, primary pumps and steam generator. Three water tanks can be seen in the right foreground while the feedwater and evaporator, essential to the plant's closed cycle, pressurized-water system, are in the right background.**

FROM chemists and chemical engineers we require path-breaking performance in several fields. Perhaps most important to the future of the industry is the requirement for development of economic processes for chemical separation of radioactive materials from irradiated fuel elements. In the present stage of the industry, with future processing volume and fuel element types uncertain, we ask that the chemical processing methods developed have a great degree of flexibility and be able to operate economically on a small scale. To accomplish this will require the utmost in ingenuity.

The chemical engineer is also concerned with the ability of materials and equipment in reactors to withstand corrosion by coolants. Extensive tests must be carried out to determine the long term behavior of pumps, valves, and heat exchangers under actual conditions of temperature, radiation, and flow. Corrosion problems constitute a major difficulty at present in the program to develop homogeneous reactors.

A large nuclear power reactor will produce large volumes of waste fission products and other radioactive debris. Storage in tanks is not a permanent nor adequate solution. New methods are under development but the ideal solution in terms of cost and positive control of the radioactivities still appears to require intensive work. This also is a problem in which chemists and chemical engineers must work in close collaboration with sanitary engineers.

Mechanical engineers have been asked to design pumps which will operate at very high pressures without any leakage. The same is true for valves, heat exchangers, and all other equipment handling radioactive solutions. We look to mechanical engineers also to design the highly responsive and rapidly moving control rods on which the nuclear stability of the reactor depends. The mechanical drive components which operate these rods must be designed so that the rods can be accurately positioned in a fraction of a second. There is need also for remotely controlled mechanisms for removing, transporting, and processing spent fuel elements and for inserting fresh ones.

THE enormously complex instrumentation needed to operate and control reactors presents a challenge primarily for electrical and electronic engineers. The instruments must be extremely dependable because the consequences of failure can be great. Moreover, the instruments must take corrective action with minimum dependence on human agency. Characteristically there are a multiplicity of devices for detecting unusual or hazardous conditions. These must operate accurately and reliably despite high temperatures and pressures and despite exposure to radioactivity. They must be designed also so that they can be checked and calibrated remotely. Because of the extreme difficulty of replacing faulty devices in the radioactive zones of the reactor, they must be designed for long operating lives, preferably approximating the expected life of the reactor itself.

Among the conditions which these devices subject to constant measurement are neutron flux, pressure, temperature, coolant flow rate, liquid level, and presence of leaks. If anything abnormal or threatening turns up in these measurements, the devices must themselves actuate, without human intervention, either an alarm system or devices which will automatically and instantaneously control or shut down the reactor.

Having stretched traditional branches of engineering to and beyond their limits, atomic energy development has also created what may be considered a wholly new specialty, the so-called nuclear engineer. He is to some extent not a specialist at all but a synthesis of aspects of traditional engineering and of science which are required in atomic energy work. His concern may be said to be chiefly in the process engineering part of reactor design. This involves calculating the distribution of neutrons and other radiations throughout the reactor as a basis for estimating the heat generation, thermal stresses, induced activity and shielding requirements of various portions of the structure. He is concerned also with calculations of heat transfer and flow requirements, activity of the reactor coolant stream, growth of fissionable material product, build-up of fission product activity, and required process cycles.

I have discussed the assignments of tasks to the various engineering specialties in a manner which exaggerates the precision of this division of labor. Actually, the situation is by no means so clear. We are often uncertain where to turn for answers to problems. Indeed, we will accept answers gladly from anyone who can offer them,

**Alfred Iddles, (left) president of The Babcock & Wilcox Company, describes to Dr. Willard F. Libby of the U. S. Atomic Energy Commission, a model of a core of a reactor similar to one B&W has contracted to build for Consolidated Edison's proposed atomic power plant at Indian Point, N. Y. The core was part of a display at the first U. S. Trade Fair of the Atomic Industry held in Washington, D. C.**

and tasks tend to be assigned sometimes more on the basis of probable capacity to deliver as an individual than on the basis of specialized background.

ALL this brings me back to something mentioned earlier—that atomic energy work requires to an almost unprecedented degree the coordinated efforts of a professional team with varying backgrounds. This imposes a task not only for science and engineering but also for administration. Coordination of such a team effort, especially among specialists whose training and experience may be conducive to separate and isolated activity, is by no means a simple task. For example, poor communications between parts of organizations working on different aspects of a common problem have in more than one instance been a source of difficulty and delay. One way this has occurred is when groups running into snags have been reluctant to tell about their difficulties, and other groups have moved ahead out of phase on the mistaken assumption that all was well. It may well be that in our concern with technical and scientific staffing we have sometimes overlooked the need for getting administrative and organization talent into our organizations to overcome these difficult problems.

I might close by giving you a statistical indication of the part which engineers play among AEC research and development contractors doing nuclear power work. Our data indicate that engineers constitute approximately thirteen per cent of total employment by such contractors. Among the engineers, the percentage distribution is currently about as follows:

| | | | |
|---|---|---|---|
| Chemical | 12 per cent | Other (largely "nuclear" and metallurgical) | 26 per cent |
| Electrical | 28 per cent | | |
| Mechanical | 34 per cent | | |

It seems clear that the solution to the many vexing problems of nuclear power are to be primarily the responsibility of the engineer, and that one feature of this responsibility is the need for him to make full use of the contributions which can be made by physical scientists. However, he must utilize his imagination and initiative, his organizing and planning abilities, and his judgment and experience as an engineer to the maximum extent or we may, indeed, find the promise of nuclear power will remain unfulfilled.—***End.***

## *About the Authors . . .*

**Mr. Wormser**

Felix Edgar Wormser was born in Santa Barbara, California, on October 31, 1894. He received a degree in mining engineering from Columbia University in 1916; honorary, Doctor of Engineering, Montana School of Mines, 1953. Mr. Wormser began his professional career gold mining and surveying in the Blue Mountains (Oregon) and along the Snake River in 1916. He was employed as an Assayer and Mining Engineer, Cornucopia, Oregon, in 1916 and 1917; U. S. Mineral Surveyor in 1917, and as an engineer, Bureau of Mines, Department of the Interior, in 1919. For a time he was a member of the McGraw-Hill editorial staff in New York, and for several years was engaged in private industry as a consulting mining engineer. From 1947 to April 1953 he was president of the Lead Industries Association in New York, after having been with that organization since 1928. From 1947 to April 1953 he was also vice president of St. Joseph Lead Company in New York.

As assistant secretary of the Interior for Mineral Resources, he has supervision over the Bureau of Mines, the Geological Survey, the Office of Geography, the Office of Oil and Gas, the Defense Minerals Exploration Administration, and the Office of Minerals Mobilization.

**Mr. Lasky**

Samuel G. Lasky, mining engineer and mining geologist, was born in Denver, Colorado, July 22, 1901. He received his E. M. degree from the Colorado School of Mines in 1922, his M. S. in geology from Yale University in 1929, and a diploma from the Industrial College of The Armed Forces in 1951. From 1922 until 1931 he held the following positions: successively refinery foreman, mill shift boss and superintendent of construction, New York and Honduras Rosario Mining Company, Honduras, Central America; instructor in chemistry, Colorado School of Mines; mine shift boss, Phelps-Dodge Corporation, Morenci, Arizona; mining engineer and geologist, Kennecott Copper Corporation, Kennecott, Alaska; geologist, New Mexico Bureau of Mines and Mineral Resources. In 1931 he joined the United States Geological Survey as a field geologist; during World War II, he was regional geologist in charge of strategic materials investigations in the western States, and later became chief of a section newly created to maintain a continuing appraisal of the mineral resources of the United States. In 1951-52 he was interior member on the Munitions Board Interdepartmental Stockpile Committee. Currently, he is staff assistant (minerals), technical review staff, Office of the Secretary of the Interior.

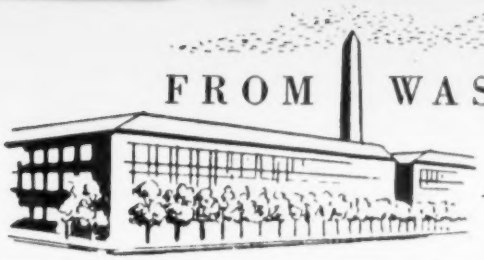
**Mr. Davis**

W. Kenneth Davis was appointed director, Division of Reactor Development, U. S. Atomic Energy Commission, on February 24, 1955, having served as deputy director of the Division since August 1954. He joined the Commission's staff as assistant director in charge of the Division's technical projects in April 1954.

He was born in Seattle, Washington, July 26, 1918. After majoring in chemistry at the University of California from 1936-1938, he received degrees of B.S. (1940) and M.S. (1942) in chemical engineering from the Massachusetts Institute of Technology.

Mr. Davis was assistant director, Buffalo Station, M.I.T. School of Chemical Engineering Practice, from 1941-1942. He was employed by the California Research Corporation as senior research engineer from 1942-1947 and served Ford, Bacon & Davis, Inc. (New York) as senior engineer from 1947-1949.

He was appointed associate professor of engineering at the University of California, Los Angeles campus, in 1949 and became professor of engineering in 1953 (while on leave of absence), resigning from the university in September 1953. In December 1950 he joined the California Research & Development Company—a Standard Oil Company of California subsidiary engaged in classified work for the AEC—as chief development engineer, becoming manager of the company's research division in 1952.




By
Milton F. Lunch,
*N.S.P.E.'s Legislative Analyst*

# STATE LICENSURE NOT APPLICABLE TO FEDERAL CONTRACTORS

THROUGHOUT the fifty year development of the state engineering registration laws there has periodically arisen the question whether the state statutes can be applied to engineering employees of the Federal Government in the execution of their official duties, and the corollary question of application to engineering operations within the states by private practitioners on behalf of the Federal Government.

A recent decision by the Supreme Court of the United States, although not directly involving professional engineering services, deals with the principles involved and casts further light on the matter, particularly on the application of the licensing law to Federal contractors.

The State of Arkansas has a law requiring contractors to obtain a license from the Contractors Licensing Board before submitting bids, executing construction contracts and performing construction work. Five out-of-state contractors, engaged in construction work for the Federal Government in Arkansas without obtaining the State licenses, were convicted of violating the law and fined $200 each. The Supreme Court of Arkansas upheld the convictions over the objections of the U. S. Department of Justice, which argued that the State law could not properly be applied to Federal contractors, and that the license requirement resulted in a reduced number of bids and was contrary to the public interest. The state Supreme Court held, however, that "an independent contractor is not clothed with governmental immunity solely because of his contractual relationship with the Federal Government."

On appeal to the U. S. Supreme Court, again supported by the Justice Department, the convictions were reversed and the state law held inapplicable to Federal contractors. The high court noted that the Federal Armed Services Procurement Act specifies the standards and conditions to govern award of contracts by the defense agencies and that the criteria under the Federal law is in conflict with the criteria in the state law for issuance of a state license.

"Subjecting a Federal contractor to the Arkansas contractor license requirements would give the State's licensing board a virtual power of review over the federal determination of 'responsibility' and would thus frustrate the expressed Federal policy of selecting the lowest responsible bidder," the decision stated.

In coming to this conclusion, the Supreme Court cited a 1920 decision which dealt with the first question posed—can a state impose its licensing requirements on Federal employees in the execution of their duties? In that case one Johnson was an employee of the Post Office Department and was arrested by Maryland authorities for driving a post office truck without having a State drivers license. The Supreme Court said this raised the question "whether the state has power to require such an employee to obtain a license by submitting to an examination concerning his competence and paying three dollars, before performing his official duty in obedience to superior command?" Their answer was in the negative. The principle established by the Court was:

"It seems to us that the immunity of the instruments of the United States from state control in the performance of their duties extends to (and exempts them from) a requirement that they desist from performance until they satisfy a state officer upon examination that they are competent for a necessary part of them and pay a fee for permission to go on. Such a requirement does not merely touch the government servants remotely by a general rule of conduct; it lays hold of them in their specific attempt to obey orders and requires qualifications in addition to those that the government has pronounced sufficient. It is the duty of the department to employ persons competent for their work and that duty it must be presumed has been performed."

These two decisions would appear to settle conclusively that the state engineering registration laws cannot reach Federal engineering services through employment or contract. But neither decision forecloses the Federal Government as an employer from requiring state registration of its engineers, nor from requiring state registration for consulting engineering services as a contractor. As stated by the Supreme Court, "it is the duty of the (government) to employ persons competent for their work . . . " In the case of professional services Congress has in some cases turned to the state licensing laws as the basis for determination of competence.

*(Please turn the page)*

## SMALL BUSINESS'S RESEARCH PROBLEMS STUDIED

One of the major areas of Congressional interest this year is scheduled to be the economic plight of small business. Of the many facets to this problem a major one is the competitive disadvantage of small business in research and development operations. As put by the President's Cabinet Committee on Small Business in a recent report: "The pace of technological change has been accelerating in recent years. Large and well-financed firms have become accustomed to undertaking costly research and development programs, which enable them to set the pace or to meet the pace of industrial innovation and investment. Small business enterprises cannot normally do this." The Committee has recommended that the President call a conference on technical research, development and distribution, for the benefit of small business.

Along this general line, a recent report to the President and the Congress by Attorney General Herbert Brownell, Jr., contains some comments which are of considerable significance to the engineering profession and the large-industry users of engineering and scientific talent. The report declares that Government spending for research and development may be concentrating more and more economic power in the hands of big companies. Of an estimated $7 billion current annual rate of spending by all American sources for research and development, some $2½ billion represents research done by the Government itself or by non-profit institutions, according to the report. Of the remaining $4½ billion done by private business, more than $1½ billion is paid for by the Government.

**Herbert Brownell, Jr., Attorney General of the United States**

The Brownell report states that the carrying out of Government-sponsored research and development directly affects the available supply of competent technical personnel, "probably the bottleneck most threatening to the future of the defense effort." In analyzing the benefits to industry from performance of Government research, the report deals with the acquisition and training of scientific personnel, noting that "participation in research depends on first securing the services of adequately trained personnel." After referring to the "shortage," "recruiting teams scouring the country," "somewhat astonishing salaries for newly graduated engineers," etc. the following benefits are cited:

1. The increase in their research and development budgets, including allowances for personnel.
2. Recruiting costs can, under currently accepted accounting procedures, be charged to corporate overhead and are reimbursable by the Department of Defense.
3. An increased opportunity to promise work of an interesting and challenging professional nature.
4. Better salaries and possibilities of advancement.
5. Personnel initially hired for Government contracts are likely to remain for other company projects.

The report also notes: "Indeed, the hiring position of Government contractors has been so improved by reason of salaries industry participants are able to pay, that Government itself is losing many of its irreplaceable scientists. The paradox, of course, is that the Government is largely subsidizing these salaries." This is the point which has so concerned Rep. Davis, Chairman of the House Manpower Utilization Subcommittee (AE, Jan., 1957). And the Attorney General also notes with alarm that the competition for engineers threatens "the number or at least the quality of future entrants into these fields, by siphoning off the best teachers and university researchers."

To place more research and development work in the hands of small business, the Attorney General suggests consideration of the following points:

1. Find ways of simplifying bid procedures and bidding costs.
2. Develop lists of smaller companies available for research work, and wider publication of information on possible projects for small business.
3. Contracting officers generally have no technical or engineering training; consider establishment at each major procurement office of a review board composed of qualified persons, charged with direct responsibility for broadening the base of research and development contracts.
4. A sweeping study of patent policy to determine whether big companies are increasing their power through the ownership of patents developed under Federal research grants.

# Geo. Washington Has Living Monument In Capital City

By

JOHN KANE

George Washington's long experience in surveying and mapping was a valuable asset in his efforts to select and plan a capital city for the United States.

**"A century hence, if this country keeps united (and it is surely its policy and interest to do it), will produce a city, though not as large as London, yet of a magnitude inferior to few others in Europe, on the banks of the Potomac . . ."**

***George Washington, in a letter May 16, 1798.***

FEW predictions have come more true than that from the pen of our first President. If General Washington could walk along the banks of the Potomac today, he would see that his namesake city is indeed a large and beautiful metropolis. Of course, he would see that the nation's capital has not escaped the crowding and heavy traffic conditions of 20th Century America, but taken all in all, the Federal city is a unique monument to the knowledge and wisdom displayed by Washington in its location and planning.

Today, living in a world which is all but inseparable from the creative accomplishments of engineering, it is difficult to look back to a time when America was a chain of coastal settlements on the edge of a continental wilderness. The 1957 National Engineers' Week finds us on the threshold of space satellites and a number of other projects which would have seemed incredible in Washington's day. But the thread of technological continuity does go back to the 13th Century, and the man who was so aptly described as the "father of his country" was also one of the country's first engineer-builders.

The evidence for such a conclusion is nowhere more clearly shown than in Washington's influence in the establishment of the District of Columbia as the seat of the Federal Government. It was Washington who chose the site, selected the surveyor and the city planner, approved the plans, supervised the negotiations for the sale of city lots, appointed the first commissioners, approved the first building regulations, and generally pushed and inspired the whole enterprise. In all of this, his extensive career as a land surveyor and builder gave him the technical background to plan for a city that would be worthy of the great nation he was convinced America would become in time.

As chief executive of the shaky union of often disunited states, Washington was quite aware of the necessity of establishing a permanent headquarters for the Federal Government. Many of his compatriots favored the establishment of the capital in one of the large cities such as Philadelphia or New York. Although he stayed aloof from

President George Washington made this stone house in Georgetown his headquarters while he inspected the site for the national capital of the new republic. From here he rode on horseback all over the area he selected as the future capital.

**An artist's conception of President Washington personally supervising the surveying of the land he selected as the site of the new capital. With him are the first district commissioners and the official surveyor of the district.**

—Library of Congress Photo

the long squabble over which state would have the capital, Washington felt that it should be set up in a new city—a place that would be firmly in government control and away from the special interests of the existing cities.

Washington's first recorded words on the problem of the new capital are to be found in a diary entry of July 12, 1790: "about noon had two bills presented to me by the joint committee of Congress. The one, an act for establishing the temporary and permanent seat of the Government of the United States." A good many more diary entries were made by the methodical President before his ideas for the capital were realized in fact.

The law providing for the establishment of the District of Columbia specified only that the city be located on the East side of the Potomac River between two streams known as the Eastern Branch and the Conococheague—a stretch of nearly seventy miles. President Washington was to choose the actual site.

Never one to make decisions without extensive knowledge of the facts, the President set out on horseback to look over the area. As he traveled through what was then almost an untouched wilderness, his thoughts may well have gone back to the time when, still in his early 20's and military adjutant of Virginia, he rode up the Ohio Valley and, with only a compass to guide him, made a highly accurate map of the entire journey.

Washington finally selected a site at the southern edge of the strip specified by Congress, adjoining the small settlement of Georgetown. If he wanted a place to start building a city from the ground up, Washington certainly found what he was looking for.

Acting under the authority of Congress, Washington appointed three District commissioners—an executive system which is still adhered to in the local government of the District of Columbia. His plans for the new capital did not stop at merely acquiring a site and letting the city grow around it. Washington wanted a well-thought-out plan which would avoid the helter skelter building practices which he had observed in his travels through nearly all the American cities. To get such a city plan, he engaged Major Pierre L'Enfant, a French artist and architect who had served notably in the Revolutionary armies. The President then appointed Andrew Ellicott, a well-known land surveyor, to survey and lay out the boundaries of the 10-square-mile Federal district.

WASHINGTON'S ideas about the capital are perhaps best summed up in a letter he wrote to L'Enfant shortly after the latter was put to work on the project: "It is my wish to delineate a plan wholly new and which, combined on a grand scale, will require more than ordinary exertion but not more than is within your power to procure. And as I remain assured you will conceive it essential to pursue with dignity an undertaking of a magnitude so worthy of the concern of a grand empire, I have not hesitated to express myself freely, realizing that the nation's honor is bound up in its complete achievement and that over its progress the nations of the world, watching with eyes of envy, themselves having been denied the opportunity, will stand as judge."

When Washington spoke of a "grand empire" he was looking toward a growth for the young republic in which few of his contemporaries believed. Washington always wrote as though he was convinced America would become a giant among nations. Most of his colleagues in the Congress and in the executive branch of the government seemed to consider the United States as destined to remain a small, agricultural community, protected from potential enemies chiefly by distance. Washington's larger view was carried over to his ideas for the national capital. He insisted, often over the strongest protests, that the Federal city should be large enough to accommodate a steady growth and expansion. Thomas Jefferson, no small minded individual himself, proposed that 1500 acres would be quite adequate to take care of any future needs of the capital. Washington insisted that at least 6000 acres were needed.

Having chosen the site and selected the surveyor and city planner, Washington was not content to sit back and let these experts carry out their work without his supervision. A diary entry of March 28, 1791, shows that the President personally ". . . examined the surveys of Mr. Ellicott who had been sent on to lay out the district of 10 miles square for the Federal seat; and also the works of Major L'Enfant."

**The L'Enfant Plan of the seat of the Federal Government. This is the plan approved by Washington for the new capital. The plan included avenues, intersecting circles, and areas for parks, public buildings and monuments. It was drawn up at a time when the entire district was made up of small farms and woodlots.**

WHETHER Mr. Ellicott was aware of it or not, an examination of a survey by George Washington was almost certain to be a thorough one in every sense of the term. Washington had started his land surveying career at the age of sixteen, and was a skilled and trusted surveyor before he was twenty. Maps and surveys were a part of his life as a plantation owner, land developer, military commander, Virginia legislator, and President. A map he made of his Mount Vernon estate elicited the opinion from a chief of the division of maps in the Library of Congress that "no known map of an American farm in the 18th Century is superior to it."

L'Enfant's plan for the capital city was broad in scope and highly original. The wide avenues leading into circles, and the spacious parkways which he incorporated into his over-all design are still a feature of the city. L'Enfant was a stormy figure, and his troubles with the District commissioners finally led to his dismissal by Washington. But his plan for the city was a sound one and it served as the virtual blueprint for the growth of the city right up to the Civil War.

Washington's interest in the new capital did not stop at the over-all plan for the city, but extended to the building regulations as well. In the first published announcements concerning the sale of lots in the city, Washington's name appears under a set of building regulations which give definite standards of construction. He wanted all the buildings to be of brick or stone, as frame structures were not in keeping with the dignity of a capital city. The regulations also specified that the buildings had to be harmonious and substantial.

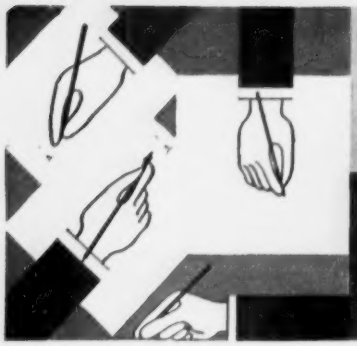
Washington did not live to see more than the beginnings of his capital city. The stately avenues which L'Enfant planned were derided by critics of the government as "streets leading into the wilderness." But Washington never let such criticism interfere with his objective of creating a wholly new city where none had been before. His faith in the growth of the city is shown in the fact that he invested in city lots himself. He purchased the lots at public auction, and during his lifetime the property was valued at approximately $21,000. In his last will and testament he offered a part of this land as a site for a national university, a project in which he had a long and deep interest.

To the visitor arriving in the city of Washington today the three structures of greatest interest are the White House, the Capitol building, and the Washington Monument. The visitor knows the last of these as a memorial to our first President. Few, however, know that the origins of both the Capitol and the White House are intimately connected with George Washington. He never saw either completed, but his influence was behind the form and shape which these buildings would take. He rode over the sites of both, and approved the locations before a shovel of ground was turned. He also laid the cornerstone of the Capitol.

Looking back over the available historical evidence, it is difficult to conclude that the nation's capital would be where it is or quite like it is if it were not for the efforts of George Washington. He left his mark on the capital city just as he left his mark on the struggling colonies and the new republic. Washington was not an engineer as we understand the term today. He very likely would be, however, if he were alive today. His early education and training shaped his mind and outlook toward an appreciation of the things that could be achieved through knowledge and technology. He was disappointed in the way young American students had to go abroad to obtain a higher education. He wanted to build up America so that it would be independent of Europe in every way.

The theme of National Engineers' Week for 1957—"Engineering . . . America's Great Resource"—is particularly appropriate in reviewing the career of our first President. Surely the technical skills which Washington possessed were a great resource at a time when the new republic was faced with so many problems of national survival. In Washington's day, as in our own times, the real resources of the country were not buried in the crust of the earth, but were actually walking around about six feet above ground—in the minds and attitudes of the people.—***End.***

**The mall between the Washington Monument and the Capitol makes up one of the most impressive views in the nation's capital city. The spacious parks and well-planned public buildings of the city were urged by President Washington in his approval of the first plan of the capital. This view looks down from the top of the Monument.**



# *Professional* POSTSCRIPTS

**NSPE has long tried to foster interest in public affairs by professional engineers. Right this policy is, for we cannot escape the fact that politics affects the daily lives of us all. Therefore, we are pleased to print below the results of some serious thinking on some grave problems by Mr. Ray C. Burrus, a member of NSPE and presently a consulting engineer in Washington, D. C. Why not read Mr. Burrus' piece and then tell us what *you* think?**

—PP—

THE subject of this discussion might well be entitled—"Foreign Industrial Development — *Late* 20th Century Model." "Late" is the proper adjective because only in recent months, beginning July 27, 1956, to be exact, has the principle of competitive free enterprise been proclaimed in a new program for financing industrial projects in the under-developed areas of the world by an international organization having United States Government support. This date marked the formation in Washington, D. C., of the International Finance Corporation, with cash loan capabilities of $78 million, as an affiliate of the World Bank (International Bank for Reconstruction and Development).

One quotation from the policy announcement of IFC, published on August 10, 1956, serves to emphasize the significance of the somewhat belated restatement of the theory that private free enterprise is the surest road to efficient and economical industrialization of the less developed areas of the free world. The quote is:

> **"IFC's objective is to further economic development by encouraging the growth of productive private enterprise . . . particularly in less developed areas. *It will not* invest in undertakings which are government-owned and operated or in the management of which the government participates to any significant extent."**

The free world is indeed fortunate that a group of experienced financial people, responsible for the establishment of IFC, have had the courage to declare, at long last, that the path to sound economic industrialization in foreign areas is industrial development by the employment of private capital resources. In unusually bold words, the IFC policy statement deals a telling blow to the idea that higher standards of living, to which industry contributes, can be achieved through socialization, nationalization or other form of Government ownership and management of facilities for production.

The concept of the IFC policy statement is refreshing after so many years of United States aid in the furtherance of the socialization of industry in many areas of the free world. It is submitted that the loan or grant of United States dollars to a foreign government for the construction of a steel mill, a cement plant, chemical facility or other manufacturing or production unit is not the promotion of productive private free enterprise. It is the support and abetment of socialism—nothing less.

Why have we been engaged for so many years in a multi-billion dollar drive to support and expand the socialized or nationalized development and control of industrialization in foreign countries? Why have our dollars been dedicated in hundreds of instances to the furtherance of alien systems which do violence to our own concept of economic well-being?

Unquestionably, there are many answers. Of necessity, this discussion is limited to one. One reason is the failure to observe and understand certain chains of events in history, coupled with an apparent lack of faith in the American Way of life. Some area of excuse for this failure may be found in the sudden rise of socialism as signaled in the rising scourge of communism in the days following World War I.

Before the advent of the socialistic-communistic era, the Westernization of the world had moved apace. The under-developed countries and peoples were seeking to bring to themselves the advantages of life encompassed in what is called Western Civilization. Somewhere along the line the path to Westernization became clouded and socialization stepped in. The giant of the Western World, the United States, seemed unwilling or unable to influence post-World War I political thinking toward the adoption of the free enterprise private capital concept.

To understand the developments which lead to the rediscovery by IFC of the basic pattern of Westernization —American Plan—it is helpful to look back into history to determine what principles were misread, misunderstood or ignored in our mighty effort to strengthen our free world allies by doling out United States dollars for industrialization under the aegis of local non-American plan forms of government. This backward look may be accomplished in boiling down a few pages of Arnold Toynbee's latest publication—*An Historian's Approach to Religion*—in a largely non-religious chapter on "The World's Reception of Western Ways." In these excerpts which follow, are found, in simple language, the statement of certain principles which eloquently support the concept revived by IFC of industrial development via the route of free competitive enterprise among peoples in the free world.

"In the sixteenth century the Ottoman Turks, the Russians, and the Japanese readily mastered the use and manufacture of the Western fire-arms of the day. . . . Such experiences . . . made it urgent for the West's non-Western neighbours to master Western military technique and to keep abreast of its accelerating progress.

"The policy of these pioneer military Westernizers was a negative one. They wanted to take nothing . . . except the bare minimum of Western military technique that would be sufficient to secure their countries' survival. . . . None . . . were moved by any positive attraction towards the Western Civilization. Their motive for mastering elements of the Western Civilization was in all cases a wish to acquire the power that this mastery would bring with it.

"Those non-Westerners who . . . were still politically independent now recognized that they would forfeit

their independence to Western military technique of one kind or other. . . . But the pioneer Westernizers in these still independent non-Western societies all started with the aim of preserving as much as possible of their traditional non-Western civilization at the price of adopting as little as possible of Western military technique. They wanted to insure against the worst risks only at the cost of a minimum premium. The sequel demonstrated, however, that *a selective reception of elements of an alien civilization was impossible in the long run.*

"This was impossible because *every* civilization or *way of life is a pattern of conduct in which parts are interdependent.* This interdependence is so multiple and so intimate that elements which, at first sight, look as if they could not have any connection with another turn out to be indissoluble when a practical experiment is made in replacing some single native element by some single foreign element. The single native element proves impossible to eliminate without also eliminating, or at least modifying, a whole set of other native elements; *the single foreign element proves impossible to introduce without also introducing a whole set of other foreign elements.*

"Western military superiority sprang from use of Western weapons by disciplined troops; and military discipline is the apex of a pyramid of social achievement. It is the fruit of law and order in civil life; for it cannot be established without effective hygiene and without regular pay (which) . . . requires a corresponding standard of public health in civil life. . . . The regular payment of troops requires sound public finances (which) . . . require business ability and a productive economy. And the economy must be productive, not only of agricultural . . . but of industrial skill for the manufacture of armaments in the Western style.

"In what did this imposing . . . Western Civilization consist? That was a question which confronted every Westernizer who came to recognize—as all Westernizers did sooner or later—that the price of self-preservation was nothing less than the adoption of the Western Civilization in toto, without reservations. The non-Western men of genius who devined this hard truth, and acted on their insight, were all inclined to take the . . . Western Civilization at its technological face-value. They saw it as a cornucopia out of which they could draw techniques that would be of practical use in the military, political, and economic fields." "(Emphasis added)"

The outstandingly important delineation of principle embedded in the foregoing quotation from Toynbee is:

*Every way of life is a pattern of conduct in which parts are interdependent.*

The failure of our multi-billion dollar industrialization support program in foreign areas in the immediate past is our failure to appreciate the significance of this fourteen word statement of principle.

We aided our free world friends with contributions to better health, with hospitals, sanitation improvements, potable water supply, training programs, medicine and drugs.

We aided our free world friends with contributions in the field of improved agricultural production to better feed hungry millions through crop programs, agricultural machinery, irrigation projects and a host of other supporting facilities.

We aided our free world friends with contributions to better living which grow out of better and more widespread facilities for communication, such as railroads, highways, telephone and radio, harbors and docks and similar installations.

We hoped sincerely to establish a firm foundation under these many beneficial aid programs by contributing to the industrialization of the less developed countries in supplying funds for steel mills, refineries, and factories of a hundred types.

We felt that if these underdeveloped countries and less privileged peoples could enjoy the standards which we Americans enjoy, then their position in the free world as our staunch friends and allies would be assured.

To be brutally frank, we sought to shape these peoples in our own image; at least in a miniature, if somewhat crude, reflection of our image.

In the most important part of the job we failed. We failed in the goal of establishing in other parts of the world the firm foundations of a thriving industrial economy to support the other major elements of our plan promoting the American Way of life on a broad scale. In our industrialization approach we left out one important part—we left out the development of a free competitive private enterprise.

Unselfishly, we wanted these less privileged peoples to enjoy our way of life. We spent billions to make our wish come true. We overlooked the principle that every way of life is a pattern in which parts are interdependent. We forgot that the essential element or ingredient of our American Way of life is industrial development by competitive free enterprise growing out of private capital investment.

GOVERNMENT-OWNED, socialized, nationalized or communized industrial establishments which have been created by our dollars lent or given to these peoples are not one and the same with facilities created by private capital dollars in a free economy.

In the American Way of life, the pattern includes competitive private enterprise for the development of industry in a free economy as one of the key interdependent parts.

It is possible that the appearance of the International Finance Corporation on the world scene in the area of foreign industrialization financing may bring about the realignment of our foreign aid objectives. The IFC announces that it will not finance socialized, nationalized or communized industrial development projects in foreign areas. Perhaps this clearly stated position will encourage the administrators of the several agencies of government engaged in dispensing foreign aid, to take a new look at their own principles or precepts and revise them with the view to realizing greater success in strengthening the free world by encouraging the adoption of that one part of our way of life which has made us strong—competitive private free enterprise.

—PP—

**Engineer Traver Smith of San Jose, Calif., an ex-president of the Santa Clara Valley Chapter of the CSPE, has sent along to us**

**Oklahoma Society of Professional Engineers**—Annual Meeting, February 8-9, 1957, Lawtonian Hotel, Lawton, Oklahoma.

**NSPE Spring Meeting**—February 15-16, 1957, Hotel Francis Marion, Charleston, South Carolina.

**Tennessee Society of Professional Engineers**—Annual Meeting, February 15-16, 1957, Andrew Jackson Hotel, Nashville, Tennessee.

**Minnesota Society of Professional Engineers**—Annual Meeting, February 20-21, 1957, St. Paul Hotel, St. Paul, Minnesota.

**New Mexico Society of Professional Engineers**—Annual Meeting, February 22-23, 1957, Roswell Sr. High School, Roswell, New Mexico.

**Iowa Society of Professional Engineers**—Annual Meeting, February 26-27, 1957, Fort Des Moines Hotel, Des Moines, Iowa.

**NSPE State Presidents' Conference**—March 7-9, 1957, Memorial Union, Purdue University, Lafayette, Indiana.

**NSPE Annual Meeting** — June 6-8, 1957, Statler Hotel, Dallas, Texas.

**the two winners of an essay contest sponsored by the Chapter dealing with what the young graduating engineer expects from a prospective employer. The winners, students at San Jose State, are future engineers Robert W. Ruth and Jack O'Loughlin. Let's hear first from Mr. O'Loughlin.**

—PP—

EVERY year the colleges and universities of the United States confer engineering degrees upon young men who have completed the required curriculum. Their schooling has consisted of a sprinkling of general education, plus a thorough saturation of the fundamentals of engineering in physics, chemistry, math, etc. They have learned to reason and to analyze. They possess a framework of truth, physical and humane, on which to build.

What comes next? is the question pondered by every graduate. The student is now a graduate with an engineering degree, but how does he become an engineer? The usual process is to take an engineering job. But does taking a job make him an engineer? By definition an engineer is one who applies science to design, manufacture, or construction. He is the transition between science and its applications. Thus, one becomes an engineer by learning the fundamentals of science in school, and by applying them on the job. When he becomes proficient, the graduate may be recognized by his state, and by his engineering group, as a competent registered engineer.

When the graduate takes a job he is anxious to apply his knowledge to engineering, but his employer must help him make the transition from graduate to engineer. The graduate does not want just a job. He wants *the* job. The job being the one which satisfies mentally, psychologically, and technically. The person not only must fulfill the job, but the job must fulfill the person's professional desires.

The main thing then that the graduate requires of the employer is a greater interest than generally shown in the placement and development of the young engineer. There is seldom if ever such a thing as the job predestined at birth. However, it should be possible to find the available job that is best suited to the young engineer's capabilities and interests. Thus, the employer should pay great heed to the development of the graduate's broad background into a finished product. This should be done by extensive observation and guidance.

At the present time there are usually two distinct groups of graduating engineering students. One consists of the older married veterans, while the other consists of the young single men. The older group tends to consider security, good living environment, and good working conditions somewhat more highly than the younger group. In the main, however, both groups are looking for just two things: a satisfying professional life and a satisfying personal life. One may not necessarily follow the other, but if the job is satisfying professionally, it is quite likely that one's personal life will be the better. And the chance for a satisfying professional life is all that the graduate can ask of a prospective employer.

## *And now here is Mr. Ruth . . .*

FOR most college students (and engineering students are no exception) the most important consequence of graduation is finding employment. The graduate or prospective graduate looks over industry, and in turn, industry looks him over. It is said that, "all marriages are happy—it's the living together afterward that causes all the trouble." So it is with the relationship between employer and employee—the day of signing the employment contract is a happy one, but it is only the beginning of what can result either in a mutually advantageous, long-lasting relationship, or a short, disagreeable one. It is important at the start that both employee and employer know what each expects of the other, and with this in mind, I would like to serve as a spokesman for the graduating engineers and tell you what we expect of industry, and what we feel we have to offer industry in return.

We feel that industry must offer us four things in exchange for our services. First, it must offer us opportunity for advancement; second, it must treat us as individuals; third, it must offer us adequate material compensation; and last, it must offer us good working conditions and the type of engineering work in which we're interested.

Opportunity for advancement has two facets—personal and professional. Under personal opportunity, we want to know that if we exhibit the necessary ability and initiative, we will be promoted; further, as our abilities increase, we expect to be given increasingly important jobs. Most of us are not going to be very productive for the first few months in industry, but as soon as we're capable of handling important assignments, we want to be given them.

Under professional opportunity, we need to be encouraged in the pursuit of further education. This encouragement can be in the form of payment of our tuition fees for night or correspondence courses, or it can merely be informing us of the educational opportunities in the area.

SOMEWHERE in every topic of this type, the subject of money comes up—and a very important one it is. In regard to salary, I can only say that we expect to receive a salary comparable to the salaries of other men in the same locality who are engaged in the same type of work. The question also is raised as to how much inducement is offered by a company which has "fringe benefits." I will answer in this manner: it makes a company more attractive to us as prospective employees if they offer a good retirement program and other worthwhile benefits.

Last of all, we expect industry to offer us good working conditions and the type of work in which we're interested. As far as physical working conditions are concerned, we want a workplace with good lighting and heating, adequate equipment with which to work, and freedom from excessive noise. Of course we do not expect, nor do we want to work in a soundproof cubicle, but we would like to be located a little distance from the punch press department.

As far as the type of work goes, since most of us have limited industrial experience, we don't know the exact type of work in which we're interested or for which we're best qualified. Therefore, we feel that a training program of a type designed to familiarize us with the company's operations, method of doing things, and where we might fit into the future picture, is essential.

Let's turn to the other side of the ledger. What do we have to offer industry? The first thing we think of is, of course, our education. Often we feel that in the courses we take, we're only dabbling in the surf of a great ocean of knowledge, but because we *have* dabbled in the surf, we are better equipped. . . . Also, somewhere in our educational careers most of us have picked up the ability to quickly absorb new material, the ability to tackle a problem logically, and the ability to get along with people. But I feel that the most important things we can offer to industry are our sincerity, honesty, and initiative. If we continue to keep these ideals before us, the saying that "the difficult we do immediately, the impossible takes a little longer," may well prove to be true in our own careers, with resulting benefit to both ourselves and industry.

# An *American Engineer* SPECIAL REPORT

## *Re: Impact of Science on Social Forces*

● *Scientists have no lack of problems, both in their areas of study and in the world at large.*

That's the most obvious conclusion one can draw from the recent report on the social aspects of science submitted to the Council of the American Association for the Advancement of Science. The several-thousand-word report found that all was not well within the special community of science, and that scientists have a long way to go in the direction of stimulating public interest in science commensurate with its importance in America today.

Here is a summary of the major problems outlined in the report:

*—The New Scientific Revolution*

All evidence indicates that the rate of scientific research and development will be greatly accelerated in the near future. Industry is becoming increasingly dependent on research. Whole new industries have been created through direct extension of laboratory experience.

*—The Social Position of Science*

There is a strong social demand for scientific progress. But these generalizations may be made concerning the distribution of current research support: the major part of research support goes into applied research and development rather than basic science; support is heavily slanted toward physical sciences; military objectives absorb a very large part (eighty-four per cent of the Federal research expenditures) of this research support; colleges and universities have become dependent on Federal funds for the greater portion of their research activities.

The crisis in the scientific manpower situation means that the social environment in the U.S. does not elicit a maximum interest in science on the part of those who have the capability to do scientific work, or that our social organization does not permit them to receive the necessary training. Science in the public press and other media receives an unduly small share of attention. Many scientists feel that the mathematics and science requirements of high schools are too low.

*—The Internal Situation of Science*

The speed and direction of the development of science has been determined by the users of science rather than the practitioners of science. The physical sciences have grown disproportionately in comparison with the biological and social sciences. We sometimes embark on new ventures based upon advances in chemistry and physics before we are adequately informed about their consequences on life or on social processes.

The progress of basic science is not keeping up with the progress of applied science. It is now widely recognized that the existing system of publication and distribution does not fill the needs of adequate communication between scientists. The number of journals is insufficient, methods of abstracting, indexing and reviewing are inadequate. Scientific meetings have been difficult to establish. The interchange of scientific information is sometimes restricted unduly by the over-classification of data that affects national security.

*—Major Social Issues of Scientific Origin*

In some situations our enhanced ability to control nature has gone awry and threatens serious trouble. Some examples of these situations are:

Radiation dangers . . . Regardless of one's attitude toward the necessity of setting off nuclear explosions for testing purposes, there is considerable evidence that this aspect of human control over nature is a potential danger to life.

Food additives . . . The great increase in the number of man-made compounds now used in foods has not been adequately studied for possible undesirable long-range biological effects.

Fumes, smoke, and dust . . . Information on the biological effects of a new industrial substance is acquired at a very much slower pace than the rate at which new substances are made and put into use. More research is needed on the effects of fumes, smogs, and dust from industrial, automotive, and other combustion processes.

Natural resources . . . Our natural resources have been too often used without proper consideration for the consequences which might be expected from a knowledge of natural laws. Flood damage and the declining water table illustrate a similar disregard for natural laws.

*—The Role of the Organizations of Science*

In marked contrast to other associations, scientific societies seldom consider the social and economic position of their group. There is a definite and serious need for action on the part of scientists regarding human activities which have grave consequences for the health and well being of this and future generations. Atomic energy and radiation hazards are examples of such activities. There is a pressing need that scientists concern themselves with social action as the forces and processes now coming under human control are beginning to match in size and intensity those of nature itself, and our total environment is now subject to human influence.

# Former Director R. D. Stauffer Dies

A former NSPE national director, Ralph D. Stauffer, of Belmont, Mass., died recently.

Mr. Stauffer, 58, was president, director, and chief engineer of the New England Gas and Electric Association and chief engineer of NEGEA subsidiary companies. A native of Reading, Pa., and a graduate of Pennsylvania State University, he was associated with the electric and gas utility business for more than thirty years.

Mr. Stauffer

He was a past president of the Massachusetts SPE, and a registered professional engineer in the states of Massachusetts, New York, New Jersey, Pennsylvania, North Carolina, and Maryland.

Active in various organizations, he was vice president of the Rotary Club of Belmont, a member of the Chamber of Commerce of Cambridge—serving as a director in both groups. He was also a trustee of the Belmont Savings Bank and member of the Engineers Club and Faculty Club, Senior Deacon of Payson Park Church of Belmont, and president of Ragged Mountain Fish and Game Club.

He leaves a wife, Naomi (Riegel) Stauffer; a son, Richard R.; two daughters, Mrs. David (Nancy) Carr of Penns Grove, N. J., and Mrs. Arthur (Doris) Wight, Jr., of Wellesley, Mass., and two sisters, Miss Helen A. Stauffer and Mrs. Marian Keller, both of Reading, Pa.

# Ohio 'Engineer' Guilty of Fraud

Careful scrutiny by the Ohio Board of Registration for Professional Engineers and Surveyors has led to a final guilt conviction for Walter Burke, Berea, Ohio. He was tried before Judge Thomas Duffy of the Columbus Municipal Court on January 3 and found guilty to the charge of fraud and deceit in obtaining Ohio registration No. 17253 as a professional engineer.

The case began in 1950 when Burke applied for and received his registration under the veterans' extension which expired only eighteen days after his application. Nothing more was heard about him until he applied for a position on the staff of an Ohio college. He claimed to be both a P.E. and a graduate of Ohio State University. Upon closer examination of his transcript of grades and a re-checking of his graduation, both documents were found to be forged.

The law requires that someone file charges against a person before the board can hold a hearing. Lloyd A. Chacey, OSPE executive secretary, filed the charges and a board hearing was heard on January 20, 1956. On evidence produced by Ronald B. Thompson, registrar and examiner at O.S.U., his registration was revoked pursuant to the provisions of Section 4733.22 Revised Code.

Burke said that he had not received any money for practice as a professional engineer. Therefore, since engineering was not his livelihood, the revocation of his registration was actually not a punishment. In order to protect the public from such future cases of fraudulent deceit, the Ohio Society decided Burke should be tried in court.

Burke pleaded guilty. He told the court that he had received no money as a professional engineer, that he had no previous court record, and that he had a family to support. He was fined $150 and costs under Section 4733.99 Revised Code.

# General Prentiss Featured Speaker

Major General Louis W. Prentiss, executive vice president of the American Road Builders' Association, will be the featured banquet speaker at NSPE's spring meeting to be held in Charleston, South Carolina, February 15-16.

Another key speaker, Clement J. Freund, dean of engineering at the University of Detroit, will discuss ethics and registration at a luncheon February 14.

Gen. Prentiss

All-day discussions on February 14 will center around the ideal registration law introduced at the National Society's 1956 annual meeting, and a compilation of rules of ethical conduct to assist in a better understanding of the canons of ethics for the engineering profession. Representatives of major engineering societies have been invited to participate in these discussions.

Professional meetings scheduled for the affair will begin February 15. William A. Morrison, mayor of Charleston, will give the welcoming address. All sessions will be held at the Francis Marion Hotel.

Arthur Fields, chief engineer of the Charleston Development Board, will speak at a luncheon February 16.

# Recent National Society News

• Executive Secretary Paul H. Robbins attended the annual meeting of the Council of Engineering Society Secretaries in New York City.

• President Robert J. Rhinehart and members of the Society staff held meeting and dinner in Washington, D. C., with Congressmen Thomas A. Jenkins and Eugene J. Keogh, authors of the Jenkins-Keogh bill, which is of concern to self-employed consulting engineers.

• The Engineers in Employ of Private Practitioners Subcommittee met in Chicago. Vice President Garvin H. Dyer attended.

# Excellent Turnout At Texas Meeting

An excellent turnout at the first Engineer-in-Industry conference in Houston, Texas, recently has resulted in plans being formulated to make an annual event of the affair. More than 150 representatives of engineers and their employers attended.

Gibbs A. Dyer, first vice president of the Texas SPE, served as conference chairman.

# Engineering Employment Practices Digest

*A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.*

✓ **Present status of the two court cases in which NSPE is participating as a "friend of the court" to protect the rights of professional engineer employees:**

**Buffalo (to exclude nonprofessional employees from professional voting units)—After losing in the District Court, the National Labor Relations Board has appealed to the Court of Appeals. NSPE will continue its support of professional separation at the higher judicial level.**

**Jersey City (to protect right of professional employees to a separate decertification election)—The engineers directly involved voted unanimously for "no union" when a rival union sought to represent them. The NLRB is seeking to have the case dismissed without decision because of this development. NSPE is asking the Court to issue a declaratory ruling on the merits as the issue will arise again. A hearing will be held on this technical point.**

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✓ *A copy of Clarence H. Evans' article, "Du Pont's Engineers Take a Forward Look at Professional Development," from the January issue,* AMERICAN ENGINEER, *is being sent to industrial executives and other readers with the* Engineering Employment Practices Newsletter. *Insertions of this character have proved valuable to indicate the mutual advantages of industrial professional development programs for other companies.*

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✓ The 11th Annual Report, "Trends in the Employment of College and University Graduates in Business and Industry, 1957," Northwestern University, shows the largest demand and highest starting salaries for engineers. Companies said they will try to hire about thirty-five per cent more engineers than last year and will offer them average starting salaries of $433 a month. But, the report shows that after ten years the engineer falls back in salary compared to other fields—engineering, $740; accounting, $778; sales, $826; general business, $768. And, there doesn't appear to be much relationship to higher starting rates against meeting personnel needs: of 81 companies which raised rates, 10 met their needs; of 62 companies which did not raise rates, 20 met their needs.

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✓ **Boeing Airplane Company's Field Test Section, Missile Testing Center, in Florida has adopted a philosophy which encourages an engineer to review the information concerning licensing and assists him in becoming licensed. The *Journal*, Florida Engineering Society, reports engineers who need time to travel elsewhere to take the exam receive full pay. Also, examination and study materials have been placed in the library for the engineers' use. Summer student engineers and cooperative program student engineers are encouraged by the company to take their examination as soon as eligible, and follow it up later when necessary experience has been acquired for full professional license.**

* * * * *

✓ *A survey by Opinion Research Corporation, made for AIEE's Committee on Management, finds that engineers think their profession is more attractive than it was ten or fifteen years ago, but there is room for improvement in relations with management. The surveyed engineers indicated they are given too much routine work, their pay is not high enough in comparison with others of the same or less ability, and they are not kept informed of company policy. Seventy-one per cent said they disagreed that the individual engineer needs some sort of a union or similar organization to represent him. The full report is scheduled for publication in the January issue of Electrical Engineering.*

* * * * *

✓ Recent NLRB decisions on professional status:

Wichita Engineering Association, ESA, sought to add twenty-three spare and senior spare engineers to the group represented by the union. The Board found they did not meet the test of professional status, citing lack of college degrees and limited exercise of independent judgement and discretion.

Bacteriologists, control chemists, research chemists, process chemists and statistical quality control analysts were given a separate vote as professionals on petition of Technical Engineers Association (Ind.) to represent employees at Miller Brewing Co. Malt technicians, process control technicians, product technicians, material control technicians and statistical quality control clerks were found nonprofessional and placed in general voting unit.

Again proving that title is the least important factor in determining professional status, five "paint testing chemists" at Jones-Dabney Co. were found nonprofessional as no special training was needed and they were hourly paid.

**Governor Marvin Griffin of Georgia signs the proclamation designating February 17-23, 1957, as Georgia Engineers' Week, watched by (l. to r.) Patrick E. Bolger, industrial engineering senior from Crete, Ill., and president of the Georgia Tech Student Council; Hugh A. Groves of Augusta, Ga., president of the Georgia SPE; Charles F. Touchton, physics senior of Dade City, Fla., and president of the Georgia Tech St. Patrick's Council, and Robert J. J. Locatell, Atlanta engineer-architect and president of the Atlanta Chapter, GSPE.**

# Engineers' Week – Feb. 17-23

PROFESSIONAL engineers throughout the country will observe the seventh annual National Engineers' Week February 17-23.

The observance, held under NSPE sponsorship since its beginning in 1951, will feature special meetings, career conferences for high school students, guided tours through local industrial firms, radio and TV programs on engineering, and many other such events.

Tributes to the engineering profession will be made during the Week on a number of network radio and TV stations. Special programs and spot announcements concerning engineering will be carried on public service time contributed by local broadcasting stations.

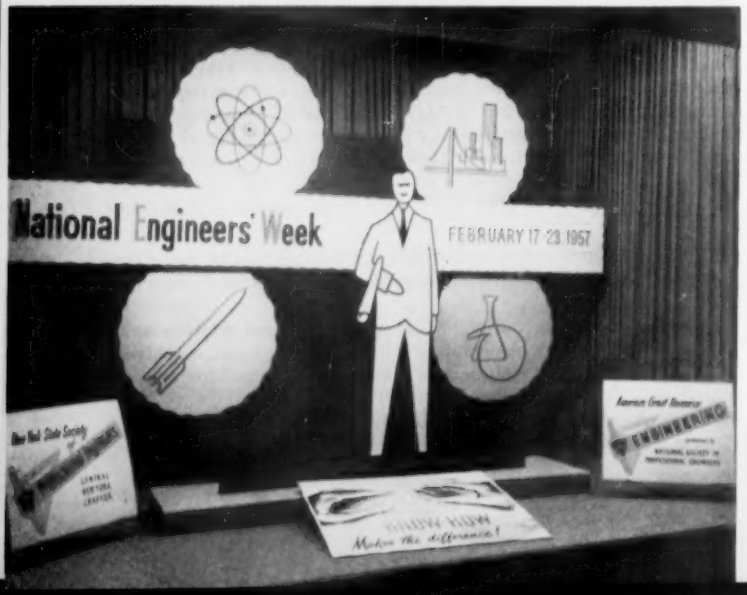
Advance preparations for the 1957 Week indicate that the observance will have a broader participation than ever before. More promotional material has been distributed by the National Society office than in any previous year. A definite increase has been noted in the number of inquiries concerning the Week from the newspaper and magazine press, industry, schools, government agencies, and engineering groups.

A considerable amount of advance publicity was reported during December and January. A full-page editorial in the January issue of the *General Electric Review* was devoted to the Week and stated in part that ". . . As a good engineer—and as a good citizen—your reason for accomplishing this objective extends deeper than the psychological feeling of wanting to be recognized as a vital and integral part of society. It extends deeper because the future of this country depends in a large part on whether the public understands—or does not understand—how the engineer fits into the economy."

Inquiries from newspaper editors indicate that many papers are planning special sections devoted to various aspects of engineering during the week of February 17-23. A logotype of the 1957 poster design was widely distributed to large magazine advertisers.

At the government level, the Week received tributes from President Eisenhower, the governors of most states, and the mayors of many cities all over the country. (The tribute from President Eisenhower is carried in full on page 13 of this issue.)

*(Continued on page 66)*




**The 1957 National Engineers' Week poster got a "blow up" to display-window size in this exhibit at the Niagara Mohawk Power Corporation, Syracuse, N. Y. The exhibit is one of a series of five by the company in New York State, obtained through the efforts of the Central New York Chapter of the New York State SPE.**

# PROFESSIONAL ENGINEERS'

# Buyers Guide

**The listed concerns are sufficiently interested in Registered Professional Engineers to advertise in your professional magazine or to request a listing in this Guide. They offer products of special interest to RPE's when buying or specifying. For convenience, Building Materials are listed first followed by products under a General Classification. Keep this Guide for future reference.**

## BUILDING MATERIALS

**BATHROOM EQUIPMENT**

The Philip Carey Mfg. Co.
Lockland
Cincinnati 15, Ohio

**BRICK**

The Evans Brick Co.
23 Newport Ave.
Uhrichsville, Ohio

The Robinson Clay Product Co.
65 West State St.
Akron 9, Ohio

Straitsville Brick Co.
New Straitsville, Ohio

**BUILDING PANELS, PLASTIC**

Wasco Products, Inc.
Bay State Rd.
Cambridge 38, Mass.

**CAULKING AND SEALING**

The Parr Paint & Color Co.
18300 Syracuse Ave.
Cleveland 10, Ohio

**CELLULAR SUB-FLOORING, STEEL**

Inland Steel Products Co.
4157 W. Burnham St.
Milwaukee 1, Wis.

**CEMENT, ACID PROOF**

Robt. L. Rowan & Assoc.
6006 Ardmore
Houston 21, Texas

**CONCRETE, PRESTRESSED**

Ready-to-Pour Concrete Co.
Box 1075
Idaho Falls, Idaho

**FLOOR DRAINS**

**Norman Boosey Mfg. Co.**
**5281 Avery**
**Detroit 8, Mich.**
**See advertisement page 6**

**FLOOR HARDENER, CONCRETE**

L. Sonneborn Sons, Inc.
404 Fourth Ave.
New York 16, N. Y.

**FLOORING, ACID PROOF**

Robt. L. Rowan & Assoc.
6006 Ardmore
Houston 21, Texas

**FLOOR MEMBERS, PRESTRESSED**

Leap Concrete, Inc.
201½ Lemon St.
Lakeland, Fla.

**GLASS BLOCKS**

Owens-Illinois Glass Co.
Owens-Illinois Bldg.
Toledo 1, Ohio

**HEATING AND VENT EQUIP.**

Durant Insulated Pipe Co.
P. O. Box 88
Palo Alto, Calif.

Ilg Electric Ventilating Co.
2850 N. Pulaski Rd.
Chicago 41, Ill.

Trion, Inc.
1000 Island Ave.
McKees Rocks, Pa.

L. J. Wing Mfg. Co.
N. Stiles St.
Linden, N. J.

**INSULATION**

The Philip Carey Mfg. Co.
Lockland
Cincinnati 15, Ohio

United States Pipe and Foundry Co.
3300 First Ave. N.
Birmingham 2, Ala.

**INTERIOR METAL TRIM**

Inland Steel Products Co.
4157 W. Burnham St.
Milwaukee 1, Wis.

**METAL FRAMING**

Unitstrut Products Co.
933 Washington Blvd.
Chicago 7, Ill.

**PAINTS, VARNISHES**

The Parr Paint & Color Co.
18300 Syracuse Ave.
Cleveland 10, Ohio

Robt. L. Rowan & Assoc.
6006 Ardmore
Houston 21, Texas

Rust-Oleum Corp.
2425 Oakton St.
Evanston, Ill.

**PAVING JOINT FILLERS AND SEALERS**

Servicised Products Corp.
6051 W. 65th St.
Chicago 38, Ill.

**PLASTIC SKYLITES**

Plastic Engineering Co. of Tulsa
3128 E. Admiral Pl.
Tulsa, Okla.

**PRESTRESSED PRODUCTS**

Leap Concrete, Inc.
201½ Lemon St.
Lakeland, Fla.

**ROOF DECK, STEEL**

Inland Steel Products Co.
4157 W. Burnham St.
Milwaukee 1, Wis.

**ROOF DRAINS**

**Norman Boosey Mfg. Co.**
**5281 Avery**
**Detroit 8, Mich.**
**See advertisement page 6**

**ROOF MEMBERS, PRESTRESSED**

Leap Concrete, Inc.
201½ Lemon St.
Lakeland, Fla.

**SHINGLES**

The Philip Carey Mfg. Co.
Lockland
Cincinnati 15, Ohio

**SIDING AND BUILDING PAPERS**

Seaman-Andwall Corp.
13050 W. Blumound Rd.
Milwaukee 1, Wis.

**SKYLIGHTS, PLASTIC**

Wasco Products, Inc.
Bay State Rd.
Cambridge 38, Mass.

**SWIM POOL DRAINS**

**Norman Boosey Mfg. Co.**
**5281 Avery**
**Detroit 8, Mich.**
**See advertisement page 6**

**TILING**

Lustro Tile Products Corp.
1066 Home Ave.
Akron 10, Ohio

**TUB ENCLOSURES, PLASTIC**

Wasco Products, Inc.
Bay State Rd.
Cambridge 36, Mass.

**WATERPROOFING MATERIALS**

L. Sonneborn Sons, Inc.
404 Fourth Ave.
New York 16, N. Y.

Servicised Products Corp.
6051 W. 65th St.
Chicago 38, Ill.

**VALVES & FITTINGS**

Chase Brass & Copper Co., Inc.
236 Grand St.
Waterbury 20, Conn.

The Fairbanks Co.
393 Lafayette St.
New York 3, N. Y.

**General Ceramics Corp.**
**Crows Mill Rd.**
**Keasbey, N. J.**

***Acid Resistant Ceramic Equipment***

***(Circle 17 on Inside Back Cover)***

Grinnell Co.
260 West Exchange St.
Providence 1, R. I.

The Lunkenheimer Co.
Beekman St. & Waverly Ave.
Cincinnati 14, Ohio

R-P&C Valve Division
American Chain & Cable Co., Inc.
Reading, Pa.

S. Morgan Smith Co.
Hartley & Lincoln Sts.
York, Pa.

Wisconsin Hydraulics, Inc.
3165 N. 30 St.
Milwaukee 16, Wis.

# GENERAL CLASSIFICATIONS

—A—

**ABRASIVES**

Behr-Manning Co.
2057 Howe St.
Troy, N. Y.

Carborundum Co.
Niagara Falls, N. Y.

Micromatic Hone Corp.
8100 Schoolcraft Ave.
Detroit 38, Mich.

Vapor Blast Mfg. Co.
3025 W. Atkinson Ave.
Milwaukee 16, Wis.

**ADDITIVES (LUBRICATING)**

Louis W. A. Bunge
1325 Sweeney Ave.
Las Vegas, Nev.

**ADHESIVES**

Higgins Ink Co., Inc.
271 Ninth St.
Brooklyn 15, N. Y.

**AGRICULTURAL EQUIP.**

Seaman-Andwall Corp.
13050 W. Bluemound Rd.
Milwaukee 1, Wis.

**AIR COMPRESSORS**

American Brake Shoe Co.
Kellogg Div.
97 Humboldt St.
Rochester 9, N. Y.

**AIR CONDITIONERS**

Clarage Fan Co.
619 Porter St.
Kalamazoo, Mich.

Morrison Steel Products, Inc.
601 Amherst St.
Buffalo 7, N. Y.

The Trane Co.
La Crosse, Wis.

**AIRCRAFT ACCESSORIES**

Newark Controls Co.
15 Ward St.
Bloomfield, N. J.

**AIRCRAFT, ENGINES & EQUIP.**

Eugene B. Hauser
1620 Park Ave.
P. O. Box 647
Hoboken, N. J.

Solar Aircraft Co.
2200 Pacific Hwy.
San Diego 12, Calif.

**AIRCRAFT GROUND SUPPORT EQUIP.**

Consolidated Diesel Electric Corp.
880 Canal St.
Stamford, Conn.

**AIR DIFFUSERS**

Pacific Flush Tank Co.
4241 Ravenswood Ave.
Chicago 13, Ill.

**AIR EQUIP.**

Jackson-Walter Co.
2027 Arch St.
Philadelphia 3, Pa.

**AIR SAMPLING**

Roy A. Martin Co.
809 Wellesley Dr., N.W.
Atlanta 5, Ga.

**ALARM SYSTEMS**

Executone, Inc.
415 Lexington Ave.
New York 17, N. Y.

Panellit, Inc.
7401 N. Hamlin
Skokie, Ill.

Conveyor Systems, Inc.
325 S. Calif. Ave.
Chicago, Ill.

**ANHYDROUS AMMONIA PLANTS**

H. Emerson Thomas & Assoc., Inc.
P. O. Box 270
Westfield, N. J.

**ARCHITECTS SUPPLIES**

Plan Hold
P. O. Box 1055
South Gate, Calif.

Stawr Equip. Co.
768 E. New York Ave.
Brooklyn 3, N. Y.

**ARTISTS SUPPLIES**

Stawr Equip. Co.
768 E. New York Ave.
Brooklyn 3, N. Y.

**ASSEMBLY MACHINES**

Aidlings, Inc.
1613 E. New York Ave.
Brooklyn 12, N. Y.

Deltec, Inc.
185 Industrial Rd.
Youngstown 9, Ohio

**AUTOMATIC CONTROL PANELS**

Model Machine Co., Inc.
4729 Hawthorne St.
Phila. 24, Pa.

**AUTOMATIC DOOR CONTROLS**

The Stanley Works
111 Elm St.
New Britain, Conn.

**AUTOMATIC LOGGING EQUIP.**

Panellit, Inc.
7401 N. Hamlin
Skokie, Ill.

—B—

**BALANCING MACHINES**

Grisholt Machine Co.
1245 E. Washington Ave.
Madison 10, Wis.

**BATTERIES**

The Electric Storage Battery Co.
Exide Industrial Div.
P. O. Box 8109
Philadelphia 1, Pa.

**BEARINGS, OILITE SELF LUBRICATING**

Amplex Div., Chrysler Corp.
P. O. Box 2718
Detroit 31, Mich.

**BENDING MACHINES**

Pines Engineering Co., Inc.
601 Walnut
Aurora, Ill.

**BLAST CLEANING EQUIP.**

Vapor Blast Mfg. Co.
3025 W. Atkinson Ave.
Milwaukee 16, Wis.

**BLAST CLEANING EQUIP.**

Wheelabrator Corp.
1710 S. Byrkit St.
Mishawaka, Ind.

**BLASTING EQUIP., MATERIALS**

Vapor Blast Mfg. Co.
3025 W. Atkinson Ave.
Milwaukee 16, Wis.

**BLOWERS**

Clarage Fan Co.
619 Porter St.
Kalamazoo, Mich.

Ilg Electric Ventilating Co.
2850 N. Pulaski Rd.
Chicago 41, Ill.

**BOOKS, TECHNICAL, SCIENTIFIC**

The MacMillan Co.
60 Fifth Ave.
New York 11, N. Y.

Johnson Research Corp.
Rt. 107
Bethpage, N. Y.

Prentice-Hall, Inc.
Englewood Cliffs, N. J.

John Wiley & Sons, Inc.
440 Fourth Ave.
New York 16, N. Y.

**BRIDGE DECKING**

Ready-to-Pour Concrete Co.
Box 1075
Idaho Falls, Idaho

**BUSHINGS**

Federal-Mogul Div.
Federal-Mogul Bower Bearings, Inc.
11031 Shoemaker Ave.
Detroit 13, Mich.

—C—

**CABLE, ELECTRIC**

Anaconda Wire & Cable Co.
25 Broadway
New York 4, N. Y.

**CABLE, MULTI CONDUCTOR**

Anaconda Wire & Cable Co.
25 Broadway
New York 4, N. Y.

**CALCULATING MACHINES**

Marchant Calculators, Inc.
1475 Powell St.
Oakland 8, Calif.

**CASTINGS**

Pittsburgh Engineering & Machine Co.
Box 986
Pittsburgh 30, Pa.

**CATALOG, ELECTRONIC EQUIP.**

United Catalog Publishers, Inc.
60 Madison Ave.
Hempstead, N. Y.

**CERAMICS, ELEC. PORCELAIN**

Universal Clay Products Co.
1528 First St.
Sandusky, Ohio

**CHEMICALS, INDUSTRIAL**

Hooker Electrochemical Co.
7 Iroquois St.
Niagara Falls, N. Y.

Kelco Co.
120 Broadway
New York 5, N. Y.

Mallinckrodt Chemical Works
Second & Mallinckrodt Sts.
St. Louis 7, Mo.

**CHEMICALS, CLEANING**

Dorn & Co.
719 S. McClellan Ave.
Decatur, Ill.

**CHEMICALS, SEWAGE TREATMENT**

The FX-Lab Co.
4 Hill St.
Newark 2, N. J.

**CHLORINATORS**

Modern Swimming Pool Co., Inc.
1 Holland Ave.
White Plains, N. Y.

**CLEANING EQUIP.**

Roy A. Martin Co.
809 Wellesley Dr., N.W.
Atlanta, Ga.

**COATINGS**

Robt. L. Rowan & Assoc.
6006 Ardmore
Houston 21, Texas

Edmund A. J. Mroz
17 Harrison St.
Melrose 76, Mass.

**COILS, INDUSTRIAL**

Dean Thermo-Panel Coil Div.
Dean Products, Inc.
616 Franklin Ave.
Brooklyn 38, N. Y.

**COILS, PANEL**

Dean Thermo-Panel Coil Div.
Dean Products, Inc.
616 Franklin Ave.
Brooklyn 38, N. Y.

**COMPRESSED AIR DEHYRATORS**

Hankison Corp.
951 Banksville Rd.
Pittsburgh 16, Pa.

**COMPRESSED AIR FILTERS**

Hankison Corp.
951 Bankville Rd.
Pittsburgh 16, Pa.

**CONCRETE ADDITIVES**

Eugene B. Hauser
1620 Park Ave.
P. O. Box 647
Hoboken, N. J.

L. Sonneborn Sons, Inc.
404 Fourth Ave.
New York 16, N. Y.

**CONCRETE EQUIP.**

Gar-Bro Mfg. Co.
2415 E. Washington Blvd.
Los Angeles 21, Calif.

General Controls
801 Allen Ave.
Glendale 1, Calif.

Kelley Machine Div.
Wiesner-Rapp Co., Inc.
285 Hinman Ave.
Buffalo 23, N. Y.

**CONCRETE FLOOR FINISHERS**

Kelley Machine Div.
Wiesner-Rapp Co., Inc.
285 Hinman Ave.
Buffalo 23, N. Y.

**CONCRETE MIXERS**

L. Burmeister Co.
4535 W. Mitchell St.
Milwaukee 14, Wis.

**CONCRETE PLANTS**

L. Burmeister Co.
4535 W. Mitchell St.
Milwaukee 14, Wis.

**CONDENSERS, EVAPORATIVE**

Cream City Boiler Co.
1613 43 St.
Milwaukee 46, Wis.

Delanium Graphite Co.
134 Elmora Ave.
Elizabeth, N. J.

**CONDUIT, UNDERGROUND**

Durant Insulated Pipe Co.
P. O. Box 88
Palo Alto, Calif.

Orangeburg Mfg. Co., Inc.
Orangeburg, N. Y.

The Stillwater Clay Products Co.
3334 Prospect Ave.
Cleveland 15, Ohio

**CONTROL EQUIP.**

Assembly Products
Wilson Mills Rd.
Chesterland 75, Ohio

General Controls Co.
801 Allen Ave.
Glendale 1, Calif.

Hagan Chemicals & Controls, Inc.
323—4th Ave.
Pittsburgh 22, Pa.

Model Machine Co., Inc.
4729 Hawthorne St.
Phila. 24, Pa.

Northeastern Engineering, Inc.
25 Bedford St.
Manchester, N. H.

Photobell Co., Inc.
43 Vesey St.
New York 7, N. Y.

Potter Aeronautical Corp.
Rt. #22
P. O. Box 532
Union, N. J.

**CONTROLS, LIQUID LEVEL**

Newark Controls Co.
15 Ward St.
Bloomfield, N. J.

**CONTROL PANELBOARDS**

Panellit, Inc.
7401 N. Hamlin
Skokie, Ill.

**CONVEYORS**

The Cleveland Crane & Engrg. Co.
Wickliffe, Ohio

**Conveyor Systems, Inc.**
**325 S. California Ave.**
**Chicago, Ill.**

***Serving All Industries***

***(Circle 18 on Inside Back Cover)***

**CONVEYORS (cont.)**

Fort Worth Steel & Machinery Co.
3600 McCart St.
Fort Worth 10, Texas

M-H Standard Corp.
515 Communipaw Ave.
Jersey City 4, N. J.

**COOLING TOWERS**

H. P. Rodgers
100 W. 25th St.
Baltimore 18, Md.

**COPPER & COPPER ALLOYS**

Chase Brass & Copper Co., Inc.
236 Grand St.
Waterbury 20, Conn.

**CORROSION INHIBITORS**

National Aluminate Corp.
6216 W. 66th Pl.
Chicago 38, Ill.

Rust-Oleum Corp.
2425 Oakton St.
Evanston, Ill.

**COUPLINGS, FLEXIBLE SHAFT GEARS**

Falk Corp.
3001 West Canal St.
Milwaukee 1, Wis.

**CRANES**

The Cleveland Crane & Engrg. Co.
Wickliffe, Ohio

Harnischfeger Corp.
4400 W. National Ave.
Milwaukee 46, Wis.

Manning, Maxwell & Moore, Inc.
Shaw-Box Crane & Hoist Div.
Muskegon, Mich.

Materials Handling Engineers
334 W. 17th South
Salt Lake City, Utah

Ohio Hoist & Mfg. Co., Inc.
321 South Beaver St.
Lisbon, Ohio

—D—

**DEAERATORS**

Cochrane Corp.
17th St. below Allegheny Ave.
Phila. 32, Pa.

Condenser Service & Engineering Co.
150 Observer Hwy.
Hoboken, N. J.

**The Permutit Co.**
**330 W. 42nd St.**
**New York 36, N. Y.**

**See advertisement page 10**

**DEBURRING MACHINES**

Pines Engineering Co., Inc.
601 Walnut
Aurora, Ill.

**DE-HUMIDIFIERS**

Clarage Fan Co.
619 Porter St.
Kalamazoo, Mich.

Pittsburgh Lectro Dryer Co.
A McGraw Electric Co. Div.
P. O. Box 1766
Pittsburgh 30, Pa.

**DEHYDRATORS, AIR**

Pittsburgh Lectro Dryer Co.
A McGraw Electric Co. Div.
P. O. Box 1766
Pittsburgh 30, Pa.

**DEMAGNETIZERS**

Magnaflux Corp.
7300 W. Lawrence Ave.
Chicago 31, Ill.

**DIE DESIGNS**

Southeastern Engineering & Sales
314 Howeston St.
Nashville, Tenn.

**DIES**

Jackson-Walter Co.
2027 Arch St.
Phila. 3, Pa.

**DIESEL ENGINES**

Harnischfeger Corp.
4400 W. National Ave.
Milwaukee 46, Wis.

**DRAFTING AIDS**

Johnson Research Corp.
Rt. 107
Bethpage, N. Y.

**DRAFTING MATERIALS**

dot-N-dasher
P. O. Box 668
Cresskill, N. J.

Chart-Pak, Inc.
Leeds, Mass.

Johnson Research Corp.
Rt. 107
Bethpage, N. Y.

Plan Hold
P. O. Box 1055
South Gate, Calif.

Stawr Equip. Co.
768 E. New York Ave.
Brooklyn 3, N. Y.

The Walpole Co.
100 Boylston St.
Boston 16, Mass.

**DRAWING INSTRUMENTS**

dot-N-dasher
P. O. Box 668
Cresskill, N. J.

**DRAWING STANDS**

General Fireproofing Co.
Youngstown 1, Ohio

**DRILLING EQUIP.**
Jackson-Walter Co.
2027 Arch St.
Phila. 3, Pa.

**DRIVES, ADJUSTABLE-SPEED**
U. S. Electrical Motors, Inc.
200 E. Slauson Ave.
Los Angeles 54, Calif.

**DROP FORGINGS**
Ladish Co.
5481 S. Packard Ave.
Cudahy, Wis.

**DRYERS, AIR & GAS**
Pittsburgh Lectro Dryer Co.
A. McGraw Electric Co. Div.
P. O. Box 1766
Pittsburgh 30, Pa.

**DUST COLLECTORS**
Eugene B. Hauser
1620 Park Ave.
P. O. Box 647
Hoboken, N. J.

S. P. Kinney Engineers, Inc.
201 Second Ave.
Carnegie, Pa.

Research-Cottrell, Inc.
Bound Brook, N. J.

Wheelabrator Corp.
1710 S. Byrkit St.
Mishawaka, Ind.

—E—

**EARTH BORING EQUIP., PORTABLE**
Gen-A-Matic Corp.
14741 Bessemer St.
Van Nuys, Calif.

**EARTH MOVING EQUIP.**
Koehring Co.
3026 W. Concordia Ave.
Milwaukee 16, Wis.

**ELECTRIC EQUIP.**
Anderson and Levy Co.
1635 Race St.
Phila. 3, Pa.

Amp-trap Current Limiters
The Chase-Shawmut Co.
Newburyport, Mass.

Crouse-Hinds Co.
Syracuse 1, N. Y.

Feedrail Corp.
125 Barclay St.
New York 7, N. Y.

**ELECTRICAL SUPPLIES**
Cannon Electric Co.
3208 Humboldt St.
Los Angeles 31, Calif.

Shawmut Fuses
The Chase-Shawmut Co.
Newburyport, Mass.

**ELECTROMAGNETIC DEVICES**
Assembly Products, Inc.
Wilson Mills Rd.
Chesterland 75, Ohio

**ELECTRIC MOTORS**
U. S. Electrical Motors, Inc.
200 E. Slauson Ave.
Los Angeles 54, Calif.

**ELECTRONIC COMPUTERS**
Marchant Calculators, Inc.
1475 Powell St.
Oakland 8, Calif.

**ELECTRONIC EQUIP.**
American Machine & Foundry Co.
Defense Products Group
1101 N. Royal St.
Alexandria, Va.

Electrodynamic Instrument Corp.
2508 Tangler Rd.
Houston 5, Texas

Electronic Corp. of America
1 Memorial Dr.
Cambridge 42, Mass.

Eugene B. Hauser
1620 Park Ave.
P. O. Box 647
Hoboken, N. J.

Northeastern Engineering, Inc.
25 S. Bedford St.
Manchester, N. H.

**Penn-East Engineering Corp.**
**Willow Ave.**
**Kutztown, Pa.**

***Design and Production of Industrial Controls Transformers***

***Magnetic Amplifiers Filters Specialists in Servo-Amplifiers and Controls***

***(Circle 19 on Inside Back Cover)***

Photobell Co., Inc.
43 Vesey St.
New York 7, N. Y.

Polytechnic Research & Development Co., Inc.
202 Tillary St.
Brooklyn 1, N. Y.

United Catalog Publishers, Inc.
60 Madison Ave.
Hempstead, N. Y.

**ELEVATORS**
**Revolvator Co.**
**8782 Tonnele Ave.**
**North Bergen, N. J.**
**See advertisement page 6**

**ENGINEERS SUPPLIES**
dot-N-dasher
P. O. Box 668
Cresskill, N. J.

Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

Plan Hold
P. O. Box 1055
South Gate, Calif.

Stawr Equip. Co.
768 E. New York Ave.
Brooklyn 3, N. Y.

**ENGINES, GAS TURBINE**
Solar Aircraft Co.
2200 Pacific Hwy.
San Diego 12, Calif.

**ENGINE GENERATOR SETS**
Consolidated Diesel Electric Corp.
880 Canal St.
Stamford, Conn.

**EVAPORATORS**
Delanium Graphite Co.
134 Elmora Ave.
Elizabeth, N. J.

Struthers Wells Corp.
Warren, Pa.

**EXPANSION JOINTS, PIPING**
Solar Aircraft Co.
2200 Pacific Hwy.
San Diego 12, Calif.

—F—

**FANS**
The Trane Co.
LaCrosse, Wis.

**FASTENERS**
Allmetal Screw Products
821 Stewart Ave.
Garden City, N. Y.

Roy A. Martin Co.
809 Wellesley Dr., N.W.
Atlanta 5, Ga.

Southco Div.,
South Chester Corp.
Lester, Pa.

**FIRE EXTINGUISHERS, EQUIP.**
Grinnell Co.
260 W. Exchange St.
Providence 1, R. I.

**FIRST AID CABINETS**
E. D. Bullard Co.
2680 Bridgeway Blvd.
Sausalito, Calif.

Mine Safety Appliances Co.
201 N. Braddock Ave.
Pittsburgh 8, Pa.

**FILING DEVICES**
Plan Hold
P. O. Box 1055
South Gate, Calif.

**FILING EQUIP.**
General Fireproofing Co.
Youngstown 1, Ohio

**Plan Hold**
**P. O. Box 1055**
**South Gate, Calif.**

***Plan Hold Vertical Filing Systems & Blue Print Holders***

***(Circle 20 on Inside Back Cover)***

Fram Corp.
Providence 16, R. I.

**FILTERS, AIR**
Hankison Corp.
951 Banksville Rd.
Pittsburgh 16, Pa.

Trion, Inc.
1000 Island Ave.
McKees Rocks, Pa.

**FILTERS, LIQUID**
Cochrane Corp.
17th St. below Allegheny Ave.
Phila. 32, Pa.

Fram Corporation
Providence 16, R. I.

**General Ceramics Corp.**
**Crows Mill Rd.**
**Keasbey, N. J.**

***Acid Resistant Ceramic Equipment***

***(Circle 21 on Inside Back Cover)***

Eugene B. Hauser
1620 Park Ave.
P. O. Box 647
Hoboken, N. J.

S. P. Kinney Engineers, Inc.
201 Second Ave.
Carnegie, Pa.

Duncan C. Milner
163 W. Exchange St.
Akron 2, Ohio

**The Permutit Co.**
**330 West 42nd St.**
**New York 36, N. Y.**
**See advertisement page 10**

Sparkler Mfg. Co.
Lake & Div.
Mundelein, Ill.

**FILTERS, LIQUID (SAND)**
Hardinge Co., Inc.
240 Arch St.
York, Pa.

**FILTERS, SAND AND GRAVEL**

Modern Swimming Pool Co., Inc.
1 Holland Ave.
White Plains, N. Y.

**FINNED TUBING INDUSTRIAL**

Struthers Wells Corp.
Warren, Pa.

**FLOW CONTROL SYSTEMS, METERS**

BIF Industries, Inc.
345 Harris Ave.
Providence 1, R. I.

Fischer & Porter Co.
590 Warmister Rd.
Hatboro, Pa.

Potter Aeronautical Corp.
P. O. Box 532, Rt. #22
Union, N. J.

**FOOD PROCESSING EQUIP.**

Edmund A. J. Mroz
17 Harrison St.
Melrose 76, Mass.

**FORK LIFT TRUCKS**

Koehring Co.
3026 W. Concordia Ave.
Milwaukee 16, Wis.

Lift Trucks, Inc.
2425 Spring Grove Ave.
Cincinnati 14, Ohio

Material Handling Engineers
334 W. 17th South
Salt Lake City, Utah

Mercury Mfg. Co.
4044 S. Halsted St.
Chicago 9, Ill.

**Revolvator Co.**
**8782 Tonnele Ave.**
**North Bergen, N. J.**
**See advertisement page 6**

Uhrden, Inc.
Dennison, Ohio

**FUEL OIL ADDITIVES**

Louis W. A. Bunge
1325 Sweeney Ave.
Las Vegas, Nev.

National Aluminate Corp.
6216 W. 66th Pl.
Chicago 38, Ill.

**FURNACES**

**Petro-Chem Development Co., Inc.**
**122 E. 42 St.**
**New York 17, N. Y.**

***Petro-Chem Iso-Flow Tubular Heaters For Any Fluid***
***(Circle 22 on Inside Back Cover)***

**FURNACES (cont.)**

Morrison Steel Products, Inc.
601 Amherst St.
Buffalo 7, N. Y.

NRC Equipment Corp.
160 Charlemont St.
Newton 61, Mass.

—G—

**GARAGE DOORS, METAL SECTIONAL OVERHEAD**

Morrison Steel Products, Inc.
601 Amherst St.
Buffalo 7, N. Y.

**GAS BURNERS**

S. P. Kinney Engineers, Inc.
201 Second Ave.
Carnegie, Pa.

**GAUGES**

The Lunkenheimer Co.
Beekman St. and Waverly Ave.
Cincinnati 14, Ohio

NRC Equipment Corp.
160 Charlemont St.
Newton 61, Mass.

**GEARMOTORS**

U. S. Electrical Motors, Inc.
200 E. Slauson Ave.
Los Angeles 54, Calif.

**GENERATORS**

Gen-A-Matic Corp.
14741 Bessemer St.
Van Nuys, Calif.

**GENERATOR SETS, ENGINE**

Consolidated Diesel Electric Corp.
880 Canal St.
Stamford, Conn.

**GEOPHYSICAL INSTRUMENTS**

Electrodynamic Instrument Corp.
2508 Tangler Rd.
Houston 5, Tex.

**GERMICIDES**

Fine Organics, Inc.
211 East 19th St.
New York 3, N. Y.

**GOGGLES**

General Scientific Equipment
7516 Limekiln Pike
Phila. 50, Pa.

United States Safety Service Co.
1215 McGee St.
Kansas City 6, Mo.

**GRAIN LEVEL CONTROL**

Jarco Services Inc.
2252 E. 11th
Tulsa, Okla.

**GREASES**

Gulf Oil Corp.-Gulf Refining Co.
1822 Gulf Bldg.
Pittsburgh 30, Pa.

—H—

**HAND TOOLS**

Proto Tools
2209 Santa Fe Ave.
Los Angeles 54, Calif.

**HAND TRUCKS**

Howe Scale Co.
Rutland, Vt.

**HANGERS (PIPE) VIBRATION ABSORBING**

The Korfund Co., Inc.
48-15 32nd Pl.
Long Island City 1, N. Y.

**HARDWARE**

The Stanley Works
111 Elm St.
New Britain, Conn.

**HEAT EXCHANGERS**

Condenser Service & Engineering Co.
150 Observer Hwy.
Hoboken, N. J.

Cream City Boiler Co.
1613 S. 43 St.
Milwaukee 46, Wis.

Dean Thermo-Panel Coil Div.
Dean Products, Inc.
616 Franklin Ave.
Brooklyn 38, N. Y.

Delanium Graphite Co.
134 Elmora Ave.
Elizabeth, N. J.

H. P. Rodgers
100 W. 25th St.
Baltimore 18, Md.

Struthers Wells Corp.
Warren, Pa.

The Trane Co.
LaCrosse, Wis.

**HEAT TRANSFER**

**Petro-Chem Development Co., Inc.**
**122 E. 42 St.**
**New York 17, N. Y.**

***Petro-Chem Iso-Flow Tubular Heaters For Any Fluid***
***(Circle 23 on Inside Back Cover)***

**HEATING AND VENTILATING EQUIP.**

The Evans Pipe Co.
23 Newport Ave.
Uhrichsville, Ohio

The Logan Clay Products Co.
Box 698
Logan, Ohio

**HEATING AND VENTILATING EQUIP. (cont.)**

The Stillwater Clay Products Co.
3334 Prospect Ave.
Cleveland 15, Ohio

Straitsville Brick Co.
New Straitsville, Ohio

Trion, Inc.
1000 Island Ave.
McKees Rocks, Pa.

**HIGH FIDELITY EQUIP.**

Kahn Associates
1141 President St.
Brooklyn 25, N. Y.

**HOPPER FEEDERS**

Aidlings, Inc.
1613 E. New York Ave.
Brooklyn 12, N. Y.

**HOSE**

Eugene B. Hauser
1620 Park Ave.
P. O. Box 647
Hoboken, N. J.

**HYDRAULIC EQUIP.**

Consolidated Diesel Electric Corp.
880 Canal St.
Stamford, Conn.

Duncan C. Milner
163 W. Exchange St.
Akron 2, Ohio

Wisconsin Hydraulics, Inc.
3165 N. 30 St.
Milwaukee 16, Wis.

**HYDRAULIC TURBINES**

S. Morgan Smith Co.
Hartley & Lincoln Sts.
York, Pa.

—I—

**INK**

Higgins Ink Co., Inc.
271 Ninth St.
Brooklyn 15, N. Y.

Marsh Stencil Machine Co.
Belleville, Ill.

**INSTRUMENTS, PROCESS CONTROL**

Assembly Products Devices
Wilson Mills Rd.
Chesterland 75, Ohio

Fischer & Porter Co.
590 Warmister Rd.
Hatboro, Pa.

G. M. Giannini & Co., Inc.
918 E. Green St.
Pasadena, Calif.

Jarco Services, Inc.
2252 E. 11th
Tulsa, Okla.

# PROFESSIONAL ENGINEERS' BUYERS GUIDE

**INSTRUMENTS, PROCESS CONTROL (cont.)**

Magnaflux Corp.
7300 W. Lawrence Ave.
Chicago 31, Ill.

Mine Safety Appliances Co.
201 N. Braddock Ave.
Pittsburgh 8, Pa.

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Illinois**
**See advertisement page 8**

**INSTRUMENTS, TESTING**

Assembly Products Devices
Wilson Mills Rd.
Chesterland 75, Ohio

Magnaflux Corp.
7300 W. Lawrence Ave.
Chicago 31, Ill.

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Ill.**
**See advertisement page 8**

Wilson Mechanical Instrument Div.
American Chain & Cable Co., Inc.
230 Park Ave.
New York 17, N. Y.

**INTERCEPTORS**

**Norman Boosey Mfg. Co.**
**5281 Avery**
**Detroit 8, Mich.**
**See advertisement page 6**

**INTERCOMS**

Executone, Inc.
415 Lexington Ave.
New York 17, N. Y.

Kahn Associates
1141 President St.
Brooklyn 25, N. Y.

Talk-A-Phone Co.
1512 S. Pulaski Rd.
Chicago 23, Ill.

**IRRIGATION EQUIP.**

Layne-Western Co.
1011 W. Harry St.
Wichita 13, Kan.

Muellermist Irrigation Co.
2612-22 S. Ninth Ave.
Maywood, Ill.

—L—

**LABORATORY APPARATUS**

Lamp Glass Dept.
Lamp Div. of G. E. Co.
Nela Park
Cleveland 12, Ohio

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Ill.**
**See advertisement page 8**

**LATHES**

Grisholt Machine Co.
1245 E. Washington Ave.
Madison 10, Wis.

**LAWN SPRINKLING SYSTEMS**

Meullermist Irrigation Co.
2612-22 S. Ninth Ave.
Maywood, Ill.

**LENSES, OPTICAL**

Lamp Glass Dept.
Lamp Div. of G. E. Co.
Nela Park
Cleveland 12, Ohio

United States Safety Service Co.
1215 McGee St.
Kansas City 6, Mo.

**LEVELS**

Kegelman Bros.
County Line Rd.
Huntingdon Valley, Pa.

**LIGHTING EQUIP.**

Crouse-Hinds Co.
Syracuse 1, N. Y.

**LINING MATERIALS, TANK**

Robt. L. Rowan & Assoc.
6006 Ardmore
Houston 21, Texas

**LININGS, CORROSION RESIS.**

**Robt. L. Rowan**
**6006 Ardmore**
**Houston 21, Texas**

***CEILCOTE Materials & Contract Installation (Circle 24 on Inside Back Cover)***

**LIQUIFIED PETROLEUM GAS PLANTS**

H. Emerson Thomas & Assoc., Inc.
P. O. Box 270
Westfield, N. J.

**LIQUEFIERS, BACTERIAL**

The FX-Lab Co.
4 Hill St.
Newark 2, N. J.

**LIQUID LEVEL CONTROLS**

Electronics Corp. of America
1 Memorial Dr.
Cambridge 42, Mass.

Jarco Services, Inc.
2252 E. 11th
Tulsa, Okla.

Newark Controls Co.
15 Ward St.
Bloomfield, N. J.

The Lunkenheimer Co.
Beekman St. & Waverly Ave.
Cincinnati 14, Ohio

**LUBRICANTS**

Louis W. A. Bunge
1325 Sweeney Ave.
Las Vegas, Nev.

Gulf Oil Corp.-Gulf Refining Co.
1822 Gulf Bldg.
Pittsburgh 30, Pa.

—M—

**MACHINE BLUE PRINT & WHITE PRINT**

Peck & Harvey Mfg. Corp.
5650 N. Western Ave.
Chicago 45, Ill.

**MACHINE PARTS, FINISHED**

Amplex Div., Chrysler Corp.
P. O. Box 2718
Detroit 31, Mich.

**MACHINERY, GENERAL**

The Sabin Machine Co.
6536 Carnegie Ave.
Cleveland 3, Ohio

**MACHINERY MOUNTINGS**

The Korfund Co., Inc.
48-15 32 Pl.
Long Island City 1, N. Y.

**MACHINERY, SPECIAL**

Aidlings, Inc.
1613 E. New York Ave.
Brooklyn 12, N. Y.

American Machine & Foundry Co.
Defense Products Group
1101 N. Royal St.
Alexandria, Va.

Deltec, Inc.
185 Industrial Rd.
Youngstown 9, Ohio

Micromatic Hone Corp.
8100 Schoolcraft Ave.
Detroit 38, Mich.

Model Machine Co., Inc.
4729 Hawthorne St.
Philadelphia 24, Pa.

The Sabin Machine Co.
6536 Carnegie Ave.
Cleveland 3, Ohio

Stanat Mfg. Co., Inc.
425 Shames Dr.
Westbury, L. I., N. Y.

**MACHINERY, SPECIAL & HEAVY**

Pittsburgh Engineering & Machine Co.
Box 986
Pittsburgh 30, Pa.

**MAGNETIC AMPLIFIERS**

Penn-East Engineering Corp.
Willow Ave.
Kutztown, Pa.

**MAGNETIC RECORDING EQUIP.**

Electrodynamic Instrument Corp.
2508 Tangler Rd.
Houston 5, Texas

**MATERIALS HANDLING EQUIP.**

The Cleveland Crane & Engrg. Co.
Wickliffe, Ohio

Colson Corp.
Elyria, Ohio

Deltec, Inc.
185 Industrial Rd.
Youngstown 9, Ohio

The Fairbanks Co.
393 Lafayette St.
New York 3, N. Y.

Feedrail Corp.
125 Barclay St.
New York 7, N. Y.

Bernard Franklin Co., Inc.
3118 Bath
Philadelphia 37, Pa.

Fort Worth Steel & Machinery Co.
3600 McCart St.
Fort Worth 10, Texas

Harnischfeger Corp.
4400 W. National Ave.
Milwaukee 46, Wis.

Howe Scale Co.
Rutland, Vt.

Materials Handling Engineers
334 W. 17th South
Salt Lake City, Utah

M-H Standard Corp.
515 Communipaw Ave.
Jersey City 4, N. J.

Ohio Hoist & Mfg. Co., Inc.
321 S. Beaver St.
Lisbon, Ohio

**Revolvator Co.**
**8782 Tonnele Ave.**
**North Bergen, N. J.**
**See advertisement page 6**

Uhrden, Inc.
Dennison, Ohio

**MATERIALS, TESTING**

California Testing Laboratories
619 E. Washington Blvd.
Los Angeles 15, Calif.

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Illinois**
**See advertisement page 8**

**MEASURING AND CONTROLLING INSTRUMENTS**

Assembly Products Devices
Wilson Mills Rd.
Chesterland 75, Ohio

Potter Aeronautical Corp.
Rt. #22, P. O. Box 532
Union, N. J.

**MEASURING INSTRUMENTS**

Polytechnic Research & Development Co.
202 Tillary St.
Brooklyn 1, N. Y.

**MEASURING TAPES AND RULES**

Eagle Rule Mfg. Corp.
509 Hunts Point Ave.
New York 59, N. Y.

**METAL FILTERS, PERMANENT**

Amplex Div., Chrysler Corp.
P. O. Box 2718
Detroit 31, Mich.

**METAL FRAMING**

Unistrut Products Co.
933 Washington Blvd.
Chicago 7, Ill.

**METERS**

Assembly Products Devices
Wilson Mills Rd.
Chesterland 75, Ohio

BIF Industries
345 Harris Ave.
Providence, R. I.

Hagan Chemicals & Controls, Inc.
323—4th Ave.
Pittsburgh 22, Pa.

**MILLING MACHINE, ATTACHMENT FOR LATHES**

Alva Allen Industries
35 & 13 Jct.
Clinton, Mo.

**MIST ELIMINATORS**

Otto H. York Co., Inc.
6 Central Ave.
West Orange, N. J.

**MOLDED SEALS**

Linear, Inc.
State Rd. & Levick St.
Philadelphia 35, Pa.

—O—

**OFFICE FURNITURE**

General Fireproofing Co.
Youngstown 1, Ohio

Kahn Associates
1141 President St.
Brooklyn 25, N. Y.

**OFFICE SUPPLIES**

Chart-Pak, Inc.
Leeds, Mass.

**OIL, LUBRICATING**

Gulf Oil Corp.-Gulf Refining Co.
1822 Gulf Bldg.
Pittsburgh 30, Pa.

**OVENS, INDUSTRIAL**

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Illinois**
**See advertisement page 8**

—P—

**PACKING EQUIP.**

Marsh Stencil Machine Co.
Belleville, Ill.

**PACKING—MECHANICAL**

Linear, Inc.
State Rd. & Levick St.
Philadelphia 35, Pa.

**PAVING MATERIALS**

Servicised Products Corp.
6051 W. 65th St.
Chicago 38, Ill.

**PEN CLEANER**

Higgins Ink Co., Inc.
271 Ninth St.
Brooklyn 15, N. Y.

**PENCILS, ARTIST**

**Swan Pencil Co., Inc.**
**225 4th Ave.**
**New York 3, N. Y.**
**See advertisement page 12**

**PENCILS, DRAFTING**

**Swan Pencil Co., Inc.**
**225 4th Ave.**
**New York 3, N. Y.**
**See advertisement page 12**

**PENCILS, PASTEL**

**Swan Pencil Co., Inc.**
**225 4th Ave.**
**New York 3, N. Y.**
**See advertisement page 12**

**PHOTOCOPIERS**

The Haloid Co.
Haloid St.
Rochester 3, N. Y.

**PIPE, CLAY**

The Evans Pipe Co.
23 Newport Ave.
Uhrichsville, Ohio

**General Ceramics Corp.**
**Crows Mill Rd.**
**Keasbey, N. J.**

***Acid Resistant***
***Ceramic Equipment***

***(Circle 25 on***
***Inside Back Cover)***

The Logan Clay Products Co.
Box 698
Logan, Ohio

**PIPE, CLAY (cont.)**

The Robinson Clay Products Co.
65 W. State St.
Akron 9, Ohio

The Stillwater Clay Products Co.
3334 Prospect Ave.
Cleveland 15, Ohio

Straitsville Brick Co.
New Straitsville, Ohio

**PIPE, CONCRETE**

Price Brothers Co.
P. O. Box 825
Dayton 1, Ohio

**PIPE, CONCRETE PRESSURE**

Price Brothers Co.
P. O. Box 825
Dayton 1, Ohio

**PIPE, FIBRE, SEWER**

Orangeburg Manufacturing Co., Inc.
Orangeburg, N. Y.

**PIPE FITTINGS & FLANGES**

The Babcock & Wilcox Co.
Tubular Products Div.
Beaver Falls, Pa.

Grinnell Co.
260 West Exchange St.
Providence 1, R. I.

Ladish Co.
5481 S. Packard Ave.
Cudahy, Wis.

**PIPE, IRON**

United States Pipe and Foundry Co.
3300 First Ave., N.
Birmingham 2, Ala.

**PLASTICS**

Hooker Electrochemical Co.
7 Iroquois St.
Niagara Falls, N. Y.

Plastic Engineering Co. of Tulsa
3128 E. Admiral Pl.
Tulsa, Okla.

Plastic Engineering Co. of Tulsa
3128 E. Admiral Pl.
Tulsa, Okla.

**POLYESTER RESINS**

Hooker Electrochemical Co.
7 Iroquois St.
Niagara Falls, N. Y.

**POWER TRANSMISSION EQUIP.**

Feedrail Corp.
125 Barclay St.
New York 7, N. Y.

Fort Worth Steel & Machinery Co.
3600 McCart St.
Fort Worth 10, Texas

**POWER TROWELS**

Kelley Machine Division
Wiesner-Rapp Co., Inc.
285 Hinman Ave.
Buffalo 23, N. Y.

**PRECISION CASTINGS**

Eugene B. Hauser
1620 Park Ave.
P. O. Box 647
Hoboken, N. J.

**PRECISION INSTRUMENTS**

Assembly Products Devices
Wilson Mills Rd.
Chesterland 75, Ohio

G. M. Giannini & Co., Inc.
918 E. Green St.
Pasadena, Calif.

Kegelman Bros.
County Line Rd.
Huntingdon Valley, Pa.

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Ill.**
**See advertisement page 8**

**PRESSES, PUNCH**

Alva Allen Industries
35 & 13th Jct.
Clinton, Mo.

**PRESSURE SENSITIVE TAPES**

Chart-Pak, Inc.
Leeds, Mass.

**PRESSURE SWITCHES**

Newark Controls Co.
15 Ward St.
Bloomfield, N. J.

**PRESSURE VESSELS**

Condenser Service & Engineering Co.
150 Observer Hwy.
Hoboken, N. J.

Cream City Boiler Co.
1613 S. 43 St.
Milwaukee 46, Wis.

Robert L. Rowan & Assoc.
6006 Ardmore St.
Houston 2, Texas

**PROPELLER FANS**

Ilg Electric Ventilating Co.
2850 N. Pulaski Rd.
Chicago 41, Ill.

**PROTECTIVE SPECTACLES**

General Scientific Equip.
7516 Limekiln Pike
Philadelphia 50, Pa.

**PUMPS**

Aurora Pump Division
The New York Air Brake Co.
41 Loucks St.
Aurora, Ill.

The Deming Co.
Salem, Ohio

**PUMPS (cont.)**

Gen-A-Matic Corp.
14741 Bessemer St.
Van Nuys, Calif.

**General Ceramics Corp.**
**Crows Mill Rd.**
**Keasbey, N. J.**

***Acid Resistant Ceramic Equipment***

***(Circle 26 on Inside Back Cover)***

Layne-Western Co.
1011 W. Harry St.
Wichita 13, Kan.

Edmund A. J. Mroz
17 Harrison St.
Melrose 76, Mass.

NRC Equipment Corp.
160 Charlemont St.
Newton 61, Mass.

Rice Pump & Machine Co.
400 Park St.
Belgium, Wis.

Viking Pumps Co.
Cedar Falls, Iowa

Wisconsin Hydraulics, Inc.
3165 N. 30 St.
Milwaukee 16, Wis.

—Q—

**QUARTZ, FUSED**

Lamp Glass Dept.
Lamp Division of G. E. Co.
Nela Park
Cleveland 12, Ohio

—R—

**RADAR EQUIP.**

American Machine & Foundry Co.
Defense Products Group
1101 North Royal St.
Alexandria, Va.

Goodyear Aircraft Corp.
1210 Massillon Rd.
Akron 15, Ohio

Eugene B. Hauser
1620 Park Ave.
P. O. Box 647
Hoboken, N. J.

Northeastern Engineering, Inc.
25 S. Bedford St.
Manchester, N. H.

**RADIO APPARATUS**

Goodyear Aircraft Corp.
1210 Massillon Rd.
Akron 15, Ohio

**RADIO EQUIPMENT**

Goodyear Aircraft Corp.
1210 Massillon Rd.
Akron 15, Ohio

**RADIO PARTS**

United Catalog Publishers, Inc.
60 Madison Ave.
Hempstead, N. Y.

**READY MIX CONCRETE PLANTS**

L. Burmeister Co.
4535 W. Mitchell St.
Milwaukee 14, Wis.

**RECTIFIERS, POWER**

Anderson and Levy Co.
1635 Race St.
Philadelphia 3, Pa.

**REDUCERS, SPEED**

Falk Corp.
3001-W. Canal St.
Milwaukee 1, Wis.

**REFRACTORIES**

The Robinson Clay Product Co.
65 W. State St.
Akron 9, Ohio

**REGULATORS, PRESSURE AND TEMPERATURE**

Assembly Products, Inc.
Wilson Mills Rd.
Chesterland 75, Ohio

General Controls Co.
801 Allen Ave.
Glendale 1, Calif.

Newark Controls Co.
15 Ward St.
Bloomfield, N. J.

**RELAYS**

Assembly Products, Inc.
Wilson Mills Rd.
Chesterland 75, Ohio

Ohmite Mfg. Co.
3601 Howard St.
Skokie, Ill.

**RESISTORS**

Carborundum Co.
Niagara Falls, N. Y.

Ohmite Mfg. Co.
3601 Howard St.
Skokie, Ill.

Polytechnic Research & Development Co., Inc.
202 Tillary St.
Brooklyn 1, N. Y.

**ROAD BUILDING EQUIP.**

Harnischfeger Corp.
4400 W. National Ave.
Milwaukee 46, Wis.

Seaman-Andwall Corp.
13050 W. Bluemound Rd.
Milwaukee 1, Wis.

**ROLLED RINGS**

Ladish Company
5481 S. Packard Ave.
Cudahy, Wis.

**ROLLING MILLS**

Pittsburgh Engineering & Machine Co.
Box 986
Pittsburgh 30, Pa.

Stanat Manufacturing Co., Inc.
425 Shames Dr.
Westbury, L. I., N. Y.

**ROOF COOLING SYSTEMS**

Muellermist Irrigation Company
2612-22 S. Ninth Ave.
Maywood, Ill.

**ROTAMETERS**

H. P. Rodgers
100 W. 25th St.
Baltimore 18, Md.

—S—

**SAFETY DEVICES**

E. D. Bullard Co.
2680 Bridgeway Blvd.
Sausalito, Calif.

The Walpole Co.
100 Boylston St.
Boston 16, Mass.

**SAFETY EQUIPMENT**

E. D. Bullard Co.
2680 Bridgeway Blvd.
Sausalito, Calif.

General Scientific Equip.
7516 Limekiln Pike
Philadelphia 50, Pa.

Mine Safety Appliances Co.
201 N. Braddock Ave.
Pittsburgh 8, Pa.

United States Safety Service Co.
1215 McGee St.
Kansas City 6, Mo.

Universal Vise & Tool Co.
Ambygad St.
Parma, Mich.

**SCALES**

Geo-Optic Company
170 Broadway
New York 38, N. Y.

Howe Scale Company
Rutland, Vt.

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Ill.**
**See advertisement page 8**

**SCIENTIFIC INSTRUMENTS**

G. M. Giannini & Co., Inc.
918 E. Green St.
Pasadena, Calif.

Kegelman Bros.
County Line Road
Huntingdon Valley, Pa.

**SCIENTIFIC INSTRUMENTS (cont.)**

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Ill.**
**See advertisement page 8**

**SCREENS, VIBRATING**

Productive Equipment Corp.
2926 W. Lake St.
Chicago 12, Ill.

**SCREWDRIVERS, TORQUE**

Richmont, Inc.
922 S. Myrtle Ave.
Monrovia, Calif.

**SEPARATORS, ENTRAINMENT**

Otto H. York Co., Inc.
6 Central Ave.
West Orange, N. J.

**SEWAGE TREATMENT MATERIALS**

The Evans Pipe Co.
23 Newport Ave.
Uhrichsville, Ohio

The FX-Lab Company
4 Hill St.
Newark 2, N. J.

The Logan Clay Products Co.
Box 698
Logan, Ohio

Pacific Flush Tank Co.
4241 Ravenswood Ave.
Chicago 13, Ill.

**SHARPENING STONES**

Carborundum Co.
Niagara Falls, N. Y.

**SHELVING, STEEL**

Bernard Franklin Co., Inc.
3118 Bath
Philadelphia 37, Pa.

**SILOS**

M-H Standard Corp.
515 Communipaw Ave.
Jersey City 4, N. J.

**SLEEVE BEARINGS**

Federal-Mogul Division
Federal-Mogul Bower Bearings, Inc.
11031 Shoemaker Ave.
Detroit 13, Mich.

**SLITTERS**

Stanat Manufacturing Co., Inc.
425 Shames Dr.
Westbury, L. I., N. Y.

**SMOKE CONTROL SYSTEMS**

Electronics Corp. of America
1 Memorial Dr.
Cambridge 42, Mass.

Photobell Co., Inc.
43 Vesey St.
New York 7, N. Y.

**SOIL SAMPLING EQUIPMENT**

Gen-A-Matic Corp.
14741 Bessemer St.
Van Nuys, Calif.

Soil Mechanics, Inc.
11525 S. Main
Houston 25, Texas

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Ill.**
**See advertisement page 8**

**SOIL TESTING APPARATUS**

**Soiltest, Inc.**
**4711 W. North Ave.**
**Chicago 39, Ill.**
**See advertisement page 8**

Soil Mechanics, Inc.
11525 S. Main
Houston 25, Texas

**SOUND SYSTEMS**

Executone, Inc.
415 Lexington Ave.
New York 17, N. Y.

**SPECIAL MACHINERY**

Southeastern Engineering & Sales
314 Howeston St.
Nashville, Tenn.

**STAINLESS STEEL**

The Babcock & Wilcox Co.
Tubular Products Div.
Beaver Falls, Pa.

**STEAM SEPARATORS**

Otto H. York Co., Inc.
6 Central Ave.
West Orange, N. J.

**STRAIN GAUGE (DYNAMOMETERS)**

The Walpole Co.
100 Boylston St.
Boston 16, Mass.

**SUPERFINISHING MACHINES**

Grishold Machine Co.
1245 E. Washington Ave.
Madison 10, Wis.

**SUPPLIES (MACHINERY)**

Universal Vise & Tool Co.
Ambygad St.
Parma, Mich.

**SURVEYING INSTRUMENTS**

Geo-Optic Company
170 Broadway
New York 38, N. Y.

Kegelman Bros.
County Line Rd.
Huntingdon Valley, Pa.

**SWITCHES, ELECTRICAL**

Ohmite Mfg. Co.
3601 Howard St.
Skokie, Ill.

**SWIMMING POOLS, SUPPLIES AND EQUIPMENT**

Modern Swimming Pool Co., Inc.
1 Holland Ave.
White Plains, N. Y.

**The Permutit Company**
**330 W. 42nd St.**
**New York 36, N. Y.**
**See advertisement page 10**

**TABLES, ELEVATING**

Colson Corp.
Elyria, Ohio

**Revolvator Co.**
**8782 Tonnele Ave.**
**North Bergen, N. J.**
**See advertisement page 6**

**TANK LINING, PLASTIC**

Plastic Engineering Co. of Tulsa
3128 E. Admiral Pl.
Tulsa, Okla.

**TEMPERATURE INDICATORS**

Assembly Products
Wilson Mills Rd.
Chesterland 75, Ohio

**TEMPLATES FOR DRAFTING**

dot-N-dasher
P. O. Box 668
Cresskill, N. J.

**TILE**

Lustro Tile Products Corp.
1066 Home Ave.
Akron 10, Ohio

**TIMERS**

Eagle Signal Corp.
202—20th St.
Moline, Ill.

**TOOL DESIGNS**

Southeastern Engineering & Sales
314 Howeston St.
Nashville, Tenn.

**TOOLS**

Micromatic Hone Corp.
8100 Schoolcraft Ave.
Detroit 38, Mich.

The Stanley Works
111 Elm St.
New Britain, Conn.

**TORQUE TESTERS**

Richmont, Inc.
922 S. Myrtle Ave.
Monrovia, Calif.

**TRACTORS**

Lift Trucks, Inc.
2425 Spring Grove Ave.
Cincinnati 14, Ohio

Mercury Mfg. Co.
4044 S. Halsted St.
Chicago 9, Ill.

**TRAFFIC DIRECTION EQUIP.**

Eagle Signal Corp.
202—20th St.
Moline, Ill.

**TRAILERS**

The Fairbanks Co.
393 Lafayette St.
New York 3, N. Y.

Ferree Motor & Equip.
2451 Randleman Rd.
Greensboro, N. C.

Martin Machine Co.
516 N. East St.
Kewanee, Ill.

**TRANSFORMERS**

Anderson and Levy Co.
1635 Race St.
Philadelphia 3, Pa.

Penn-East Engineering Corp.
Willow Ave.
Kutztown, Pa.

**TRANSITS**

Kegelman Bros.
County Line Rd.
Huntingdon Valley, Pa.

**TRENCHERS**

Koehring Co.
3026 W. Concordia Ave.
Milwaukee 16, Wis.

**TRUCK EQUIP.**

Ferree Motor & Equip.
2451 Randleman Rd.
Greensboro, N. C.

**TRUCKS, LIFT**

Colson Corp.
Elyria, Ohio

Lift Trucks, Inc.
2425 Spring Grove Ave.
Cincinnati 14, Ohio

Mercury Mfg. Co.
4044 S. Halsted St.
Chicago 9, Ill.

**Revolvator Co.**
**8782 Tonnele Ave.**
**North Bergen, N. J.**
**See advertisement page 6**

Uhrden, Inc.
Dennison, Ohio

**TRUCKS—HAND**

The Howe Scale Co.
Rutland, Vt.

The Sabin Machine Co.
6536 Carnegie Ave.
Cleveland 3, Ohio

**TRUCKS, MOTOR**

Diamond T. Motor Car Co.
4401 W. 26th St.
Chicago 23, Ill.

**TUBING**

The Babcock & Wilcox Co.
Tubular Products Div.
Beaver Falls, Pa.

**TUBING, CORROSION RESISTANT**

Chase Brass & Copper Co., Inc.
236 Grand St.
Waterbury 20, Conn.

**TUMBLING ABRASIVES**

Roto-Finish Co.
3700 Milham Rd.
Kalamazoo, Mich.

**TUMBLING BARRELS**

Roto-Finish Co.
3700 Milham Rd.
Kalamazoo, Mich.

**TUMBLING COMPOUNDS**

Roto-Finish Co.
3700 Milham Rd.
Kalamazoo, Mich.

—U—

**UNDERFLOOR DUCT, FIBRE**

Orangeburg Manufacturing Co., Inc.
Orangeburg, N. Y.

—V—

**VALVES, BACKWATER**

**Norman Boosey Mfg. Co.**
**5281 Avery**
**Detroit 8, Mich.**
**See advertisement page 6**

**VALVES, SOLENOID**

Duncan C. Milner
163 W. Exchange St.
Akron 2, Ohio

**VIBRATION CONTROLS**

The Korfund Co., Inc.
48-15 32 Pl.
Long Island City 1, N. Y.

**VISES**

Universal Vise & Tool Co.
Ambygad St.
Parma, Mich.

—W—

**WASHEVE**

Federal-Mongul Division
Federal-Mongul Bower Bearings Inc.
11031 Shoemaker Ave.
Detroit 13, Mich.

**WASTE TREATMENT EQUIP.**

Hardinge Co.
240 Arch St.
York, Pa.

Fischer & Porter Co.
590 Warminster Rd.
Hatboro, Pa.

Pacific Flush Tank Co.
4241 Ravenswood Ave.
Chicago 13, Ill.

**The Permutit Co.**
**330 W. 42nd St.**
**New York 36, N. Y.**
**See advertisement page 10**

**WATER CONTROL APPARATUS**

S. Morgan Smith Co.
Hartley & Lincoln Sts.
York, Pa.

**WATER CONDITIONING EQUIP.**

BIF Industries, Inc.
345 Harris Ave.
Providence 1, R. I.

Cochrane Corp.
17th St. below Allegheny Ave.
Philadelphia 32, Pa.

Hardinge Co., Inc.
240 Arch St.
York, Pa.

**The Permutit Co.**
**330 W. 42nd St.**
**New York 36, N. Y.**
**See advertisement page 10**

Sparkley Mfg. Co.
Lake & Div.
Mundelein, Ill.

**WATER TREATING CHEMICALS**

Hagan Chemicals & Controls, Inc.
323—4th Ave.
Pittsburgh 22, Pa.

Kelco Co.
120 Broadway
New York 5, N. Y.

National Aluminate Corp.
6216 W. 66th Pl.
Chicago 38, Ill.

**The Permutit Co.**
**330 W. 42nd St.**
**New York 36, N. Y.**
**See advertisement page 10**

**WASTE TREATMENT EQUIP.**

BIF Industries, Inc.
345 Harris Ave.
Providence 1, R. I.

Fischer & Porter Co.
590 Warmister Rd.
Hatboro, Pa.

Hardinge Co., Inc.
240 Arch St.
York, Pa.

The Permutit Co.
330 W. 42nd St.
New York 36, N. Y.

**WELDING ELECTRODES, ALLOY**

Harnischfeger Corp.
4400 W. National Ave.
Milwaukee 46, Wis.

**WELDING EQUIP., SUPPLIES**

Harnischfeger Corp.
4400 W. National Ave.
Milwaukee 46, Wis.

**WINCHES, HAND**

Ohio Hoist & Mfg. Co., Inc.
321 S. Beaver St.
Lisbon, Ohio

**WIRE CONNECTORS**

Ideal Industries, Inc.
Park Ave.
Sycamore, Ill.

**WIRE ROPE**

American Chain & Cable Co., Inc.
Wilkes-Barre, Pa.

**WRENCHES**

Proto Tools
2209 Sante Fe Ave.
Los Angeles 54, Calif.

**WRENCHES, TORQUE**

Richmont, Inc.
922 S. Myrtle Ave.
Monrovia, Calif.

## Advertisers' Index


**Adache Engineers** ..... 58
**Albright & Friel, Inc.** ..... 58
**Alvin and Company** ..... 12
**Ammann & Whitney** ..... 57
**Associated Consultants** ..... 60
**Michael Baker, Jr., Inc.** ..... 58
**Harry Balke Engineers** ..... 58
**Elmer S. Barrett Associates** ..... 58
**E. D. Barstow & Associates** ..... 58
**Black & Veatch** ..... 56
**Norman Boosey** ..... 6
**Borden Metal Products Co.** ..... 14
**George W. Brandt, Engineer** ..... 58
**Brown & Blauvelt** ..... 57
**Burns & McDonnell** ..... 56
**Burns and Roe, Inc.** ..... 57
**Capitol Engineering Corporation** ..... 59
**Homer L. Chastain & Associates** ..... 56
**Commonwealth Associates, Inc.** ..... 56
**Consoer, Townsend and Associates** ..... 56
**Conveyor System Inc.** ..... 43
**Crescent Engineering Company, Inc.** ..... 56
**DeLeuw, Cather & Company** ..... 56
**Dow Chemical Co.** ..... 9
**Thomas E. Duce Associates** ..... 60
**Ellmann Engineering Co., Inc.** ..... 60
**Encyclopaedia Britannica, Inc.** ..... 7
**Engineers Testing Laboratory, Inc.** ..... 60
**Eustis Engineering Company** ..... 56
**Eugene K. Falls** ..... 56
**Fay, Spofford & Thorndike** ..... 56
**Ferguson-Gates Engineering Company** 60
**Forrest and Cotton** ..... 60
**Foster & Cafarelli** ..... 57
**Frazier-Simplex, Inc.** ..... 59
**Freeze & Nichols** ..... 60
**Gannett, Fleming, Corddry & Carpenter, Inc.** ..... 59
**General Ceramics Corp.** ..... 41, 44, 47
**General Electric** ..... 62 & Back Cover
**General Motors** ..... 5
**Giles Drilling Corp.** ..... 60
**John P. Goggin** ..... 56
**Gustave M. Goldsmith** ..... 58
**Green Engineering Co.** ..... 59
**Hall Laboratories, Inc.** ..... 59
**Alexander Hamilton Inst.** ..... 4
**Hardesty & Hanover** ..... 57
**Frank E. Harley & Associates** ..... 57
**Frederick R. Harris, Inc.** ..... 57
**Harris Henry Lantz & Potter** ..... 59
**Philip J. Healey, Inc.** ..... 60
**The Hinchman Corporation** ..... 56
**Howard Needles, Tammen & Bergendoff** ..... 57
**Industrial Ovens, Inc.** ..... 58
**Institute of Scientific Studies** ..... 12
**J. Z. Jizba** ..... 57
**Jones, Henry & Williams** ..... 58
**Kaiser Engineers** ..... 56
**Kennedy-Riegger Drilling Co., Inc.** .. 60
**A. C. Kirkwood & Associates** ..... 56
**Elmer A. Kish** ..... 58
**Kulpian Corporation** ..... 59
**D. C. Latella & Associates** ..... 59
**Law-Barrow-Agee Laboratories, Inc.** .. 56
**Lawrie & Green & Associates** ..... 59
**Lockwood, Andrews & Newnam** ..... 60
**Louis J. Lucas** ..... 60
**Madigan-Hyland** ..... 58
**Manu-Mine Research & Development Co.** ..... 60
**Emmett J. McDonald** ..... 58
**Frank D. McEntee** ..... 60
**Metcalf & Eddy** ..... 56
**Merritt & Welker** ..... 56
**Modjeski and Masters** ..... 59
**Moran, Proctor, Mueser & Rutledge** .. 58
**Niagara Blower** ..... 11
**H. D. Nottingham** ..... 60
**James P. O'Donnell** ..... 58
**Oklahoma Testing Laboratories** ..... 58
**John Ostborg** ..... 58
**Palmer & Baker, Inc.** ..... 56
**Parsons, Brinckerhoff, Hall & MacDonald** ..... 58
**V. C. Patterson & Assoc.** ..... 59
**Penn-East Engrg. Corp.** ..... 44
**Permutit Co.** ..... 10
**Petro-Chem Development Co., Inc.** .. 45
**Pittsburgh Testing Laboratory** ..... 59
**Plan Hold** ..... 44
**Plumb, Tuckett & Pikarsky** ..... 56
**Praeger-Kavanagh** ..... 58
**Pressure Concrete Co.** ..... 60
**Ralph L. Reade** ..... 57
**C. E. Records Co.** ..... 60
**Refinery Engineering Co.** ..... Inside Front Cover
**Revolvator Co.** ..... 6
**Cyrus Wm. Rice & Co., Inc.** ..... 60
**Robert and Company Associates** ..... 56
**Russell & Axon** ..... 56
**Carl F. Schoenbaum** ..... 58
**Seelye Stevenson Value & Knecht** .... 58
**Singstad & Baillie** ..... 58
**Soiltest, Inc.** ..... 8
**Soil Testing Services, Inc.** ..... 56
**South Florida Test Service** ..... 56
**Sprague & Henwood, Inc.** ..... 60
**Stanley Engineering Company** ..... 56
**Steiner Technical Writings** ..... 60
**D. B. Steinman** ..... 58
**Sverdrup & Parcel, Inc.** ..... 57
**Swan Pencil Co.** ..... 12
**Syska & Hennessey, Inc.** ..... 58
**Tippets-Abbett-McCarthy-Stratton** .... 58
**Toledo Testing Laboratory** ..... 58
**Turner Balances and Weights** ..... 60
**United States Testing Company, Inc.** . 57
**Emerson Venable** ..... 60
**Vogt, Ivers, Seaman & Assoc.** ..... 58
**Warren Knight Co.** ..... 10
**Whitman, Requardt and Associates** ... 56
**Wight and Company** ..... 56
**Wilson & Company** ..... 56
**The Wright Engineers** ..... 60

# A LISTING OF THE STATE BOARDS

**For the convenience of our readers, we are listing below the names and addresses of the various State Registration Boards. It is suggested that this issue of the American Engineer be filed for future use.**

**Alabama State Board of Registration for Professional Engineers and Land Surveyors**
Clifton C. Cobb, Executive Secretary
711 High Street, Montgomery, Alabama

**Alaska Territorial Board of Engineers and Architects Examiners**
Leo H. Saarela, Secretary
Box 854, Anchorage, Alaska

**Arizona State Board of Technical Registration**
Mrs. Rayma Neeb, Executive Secretary,
Room 403, 128 N. 1st Avenue
Phoenix, Arizona

**Arkansas State Board of Registration for Professional Engineers**
V. E. Scott, Secretary-Treasurer
P. O. Box 175, Pulaski Heights Station,
Little Rock, Arkansas

**California State Board of Registration for Civil and Professional Engineers**
J. Douglass Locke, Executive Secretary,
529 Business & Professions Bldg.
Sacramento 14, California

**Canal Zone Board of Registration for Architects and Professional Engineers**
Gerald A. Doyle, Jr., Secretary
P. O. Box 223, Balboa Heights,
Canal Zone

**Colorado State Board of Registration for Professional Engineers and Land Surveyors**
James S. Findley, Asst. Secretary
20 Capitol Building,
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**Connecticut State Board of Registration for Professional Engineers and Land Surveyors**
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30 Oak Street, Hartford 6, Connecticut

**Delaware State Board of Registration for Professional Engineers and Land Surveyors**
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11 East 12th Street,
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**Florida State Board of Engineer Examiners**
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408 John F. Seagle Building,
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**Georgia State Board of Registration for Professional Engineers and Land Surveyors**
Cecil L. Clifton, Joint Secretary
224 State Capitol, Atlanta, Georgia

**Hawaii Board of Registration for Professional Engineers, Architects and Land Surveyors**
Wm. C. Furer, Assistant Secretary
1909 Aleo Place, Honolulu 14, Hawaii

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S. D. School of Mines and Technology,
Rapid City, South Dakota

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**Utah Professional Engineers and Land Surveyors Examining Committee, Dept. of Business Regulation**
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Salt Lake City, Utah

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Division, Transportation Bldg.
Olympia, Washington

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Charleston, West Virginia

**Wisconsin State Registration Board of Architects and Professional Engineers**
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Madison 2, Wisconsin

**Wyoming State Board of Examining Engineers**
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# *N.S.P.E. Believes*

# THE OPPORTUNITIES OF MEMBERSHIP

**BY PAUL H. ROBBINS, P.E.**

***Executive Director***

**N.S.P.E.**


THE growth of membership of NSPE undoubtedly can be attributed to many things. One general observation, however, seems evident—that more and more engineers are aware of their professional responsibilities and are willing to support an organization devoting its entire efforts in these fields.

In the last three months of 1956 over 1,300 members joined NSPE. This is the largest growth the Society has had in any comparable period. Members belong to an organization because they believe in the principles for which that organization stands. Paul O. Berg, an NSPE member in Indiana, recently took time to write what he believes to be the challenge of membership in the National Society of Professional Engineers, its state societies and local chapters. His presentation sets forth so well the comments and philosophies of many members of NSPE that it seems appropriate to record it as a guest author for "NSPE Believes."

## FLYING OUR FLAG

By Paul O. Berg

There is no organization of engineers that exists today that means more to the engineers than the National Society of Professional Engineers. Just as people of other aspirations have banded together to spread their philosophies, those in the engineering ranks dedicated to professional thinking have banded together in the National Society of Professional Engineers.

The foundation for this organization, being based upon the professional requirements of engineering, is well laid and is supporting a structure of ideals that reach to the sky. Within the framework of the NSPE are all the things that all engineers are seeking: Recognition through greater responsibility. Prestige by meeting bigger challenges. Honor through integrity of purpose. Dignity by meeting the requirements of our job.

Any engineer can succeed in reaching all the qualifications of his profession and many do, but it is only through mutual effort that engineers as a group will be inspired to raise the level of their profession.

Engineering has become of such tremendous importance that a strong society must come forward to set the pace. Already non-engineering groups are trying to represent engineers. Engineers must not be sullied by organizations dedicated to material gains. Engineers must not be governed by groups who would trade responsibility for personal gains. Engineering must not step down to the level of selfishness when the road to constant improvement lies in cooperation, service and helpfulness.

The engineers owe it to society to have a strong professional organization—not for bigness itself but to accomplish an uplifting of ideals and purposes. We have a debt to society which trusts us to work in a wholesome atmosphere. We owe it to the schools which provided us our technical knowledge to improve this knowledge and share it with others. We owe it to our parents who gave us our first conscience to stand firm for an honest attitude toward our calling. We owe it to ourselves so we can do our job right.

The NSPE believes that all these things are true. The members belong because they believe. It is every member's duty to the sincerity of his purpose to FLY OUR FLAG.

Fly it with the restlessness and fervor of foresighted men who want it better for those that follow than it was for themselves. FLY OUR FLAG.

Our future as engineers lies in engineering and we can only improve it to our pride by giving it the moral fibre of professional thinking. FLY OUR FLAG.—***End.***

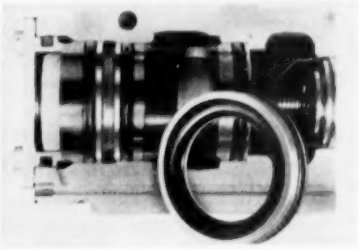
# NEW Processes . . .

## *"Permadizing" Developed In Afterburner Control*

Chandler-Evans Co., of West Hartford, Conn., is using a unique rubber-to-metal bonding process called "Permadizing" to reduce weight by 50 per cent and to cut over-all costs by 100 per cent in the manufacture of an Afterburner Control.

A development of Stillman Rubber Co., Culver City, Calif., Permadizing is used by Chandler-Evans on a valve seat designed to shut off fuel flow in a CECO AR-7 Afterburner Control. Prior to the use of Permadizing, CECO engineers anchored the rubber facing on the valve seat by drilling eight holes in the stainless steel seat to form a mechanical bond. By providing a perfect bond without holes, Permadizing enables CECO to eliminate the costly drilling operation, and to replace the expensive and heavier stainless steel with anodized dural.

Fuel flow from the Afterburner Control is shut off by a steel piston forced against the Permadized seat by a spring. When the valve is open, fuel flows at high velocity past the



edge where the rubber is bound to the base. Despite the rush of fuel, CECO engineers say the rubber remains in perfect position, with no signs of separation from the base.

A major advantage of Permadizing in the CECO application is extremely low swell. Despite periodic contact with fuel flowing past at high velocity, CECO engineers say no unacceptable swell of the rubber has been noted. In conventional rubber bonds, swell frequently occurs due to the large quantity of rubber required to create the bond. Permadizing provides a perfect bond while using only 5 to 10 per cent the rubber used in normal bonding.

## Film-a-Record Microfilm Camera

A new compact, duplex microfilm camera that photographs both sides of a document simultaneously at any of three reduction ratios has been developed by Remington Rand Division of Sperry Rand Corp.

The Film-a-Record "Model 11" is a versatile, precision-built microfilm camera, compactly designed, yet incorporating features of cameras many times its size. The unit has a 12-inch throat, and doubles 16 mm. film capacity by filming up one side and down the other using the 8 mm. principle. Readily interchangeable lenses are available for 25 to 1, 35 to 1, and 42 to 1 reduction ratios. At the 42 to 1 ratio, the Model 11 films a greater number of documents per roll of film than any other microfilm camera now available.

Full operating controls, warning buzzer and indicator lights assure simple, error-free microfilming with no special operator training needed. Light intensity is adjustable via a single Colorstat control for proper recording of various types and colors of documents.

Film capacity is 250 feet of 16 mm. film, which can be loaded in daylight.

Automatic feeding equipment and document stacker is available for use with the Model 11.

## *Three "Non-foaming" Spray Washing Compounds*

Magnus Chemical Company, Inc., announces the development of three new "non-foaming" spray washing compounds.

This new line of spray washing compounds contains a non-foaming wetting agent that allows for maximum wetting of dirt deposits without the troublesome build-up of foam. With these new products, there is no restriction as to the concentration used to obtain the cleaning result desired. Regardless of concentration and high temperature, solution will not foam.

In the past, when make-ups of ordinary cleaners were added to existing solutions, the wetting agent concentrations were built up to a point where the solutions foamed. With the Magnus "X-3" series, make ups do not present this problem.

# *With Our Members . . .*

***Some Travel 100 Miles!***

## Wives Boost Attendance At Southwest Kansas PE Chapter Dinner Meetings

Inclusion of wives to the joint dinner meetings has helped the Southwest Professional Engineers Chapter of the Kansas Engineering Society keep its attendance at a high level. Since its organization last February, the Chapter has held monthly meetings with an average attendance of fifty members and wives.

However, this is worthy of note only because the area covered by the Chapter extends approximately one hundred eighty miles east from the Kansas-Colorado State Line and one hundred ten miles north from the Kansas-Oklahoma line. This area includes twenty-two counties and comprises about one-fifth of the State area.

Eighty-four licensed engineers of which number sixty-six are members of the Society reside within this area. Attendance involves driving more than one hundred miles to the meetings for some members.

Meetings are rotated through three of the larger cities in the area: namely, Garden City, Dodge City, and Liberal. Members from other smaller cities are offering facilities for holding meetings and inviting the Chapter to visit their town in one of its monthly meetings.

The Membership Committee is busy rounding up the balance of the potential members as well as contacting the non-licensed engineers to make them eligible for membership.

Some of the wives claim a perfect attendance record and say that they are very much interested in the work that the Society is doing in the interest of their husband's profession.

### *Kansas Chapter Officers*

**Merrit R. Royer, a past president of the Kansas Engineering Society is shown giving Southwest P.E. chapter officers a few pointers on Society aims and objectives. L to R: Gordon E. Tempero, Scott City, secretary-treasurer; John E. C. Elliot, Ulysses, chapter director; Charles H. Swift, Dodge City, vice president; C. W. Heckathorn, Garden City, chapter director; J. A. Doubrava, Garden City, president; and E. L. Seidel, Dodge City, State director.**

### *Birs Elected President Suffolk County Chapter*

Charles C. Birs was elected president of the Suffolk County Chapter of the New York State SPE at its annual meeting recently.

Other officers elected included John B. Blydenburgh, first vice president; Leland C. Fitts, second vice president; Abraham Wise, secretary; Paul R. Goppoldt, treasurer, and B. C. Kime and A. B. Williams, directors.

Franklin Johnson, first vice president of the NYSSPE, installed the officers, and spoke on the activities of the State Society.

### *P.E. Certificate In Canal Zone*

**Colonel Hugh M. Arnold, chairman of the Canal Zone Board of Registration for Architects and Professional Engineers, presents Governor W. E. Potter with certificate of registration as a professional engineer. Other members of the Registration Board are, l. to r.: A. A. Mittag, L. B. Sartain, D. A. Yerkes, and G. A. Doyle, Jr., Board secretary. (See story at right.)**

### *Pres. Rhinehart Returns From Canal Zone Visit*

Robert J. Rhinehart, president of the National Society, recently returned from a trip to the Canal Zone where a full schedule was arranged for him by the Canal Zone Board of Registration for Architects and Engineers. In addition to speaking before various organizations, he also was taken on a visit to the Locks and through Gaillard Cut. Mrs. Rhinehart accompanied her husband.

Addressing the Panama Section of the American Society of Civil Engineers, NSPE's president declared that "to continue being the leading nation of the world we must concentrate on technological improvements."

In technological improvements, he included "research, to discover newer and better materials, methods, devices and machines; mass produc-

*(Continued on page 57)*

# Columbia Chapter, South Carolina SPE, Holds Meeting with Engineering Students

The Columbia Chapter of the South Carolina SPE held a recent banquet-meeting jointly with engineering students at the University of South Carolina with 139 attending.

Featured speaker at the banquet was R. K. Rouse, of Greenville, S. C., a director of the National Society, who encouraged engineering students to register and to realize their responsibilities to the public, their fellow-engineers, and themselves.

### *Garvin H. Dyer Speaks At Illinois SPE Banquet*

NSPE Vice President Garvin H. Dyer, Independence, Mo., was the keynote speaker at the third annual banquet of the Chicago Chapter of the Illinois SPE held in January. "A Profession Comes of Age" was the title of his talk.

Toastmaster for the affair was George L. De Ment, Chicago public works commissioner and a member of the National Society. The Chicago Chapter has about 450 members.

### *Engineer Registration Topic In Massachusetts*

Russell G. Warner discussed "Permissive vs. Mandatory Registration of Engineers" at a recent meeting of the North Shore Chapter of the Massachusetts SPE. Warner, a member of the Connecticut SPE, is vice president of the United Illuminating Company, New Haven, Conn.

Walter Kreske, chairman of MSPE'S Legislative Affair Committee, spoke briefly on proposed modifications of the Massachusetts Engineering Registration Law.

The next meeting of the Chapter is February 14 which is "Graduating Engineers' Night." Engineering seniors from nearby colleges will be guests of the Chapter in an effort to promote interest in the State Society. Guests will include students from MIT, Northeastern, Harvard, and Tufts.

# Ira Pitsenberger State President

Ira A. Pitsenberger, Huntington, W. Va., has recently been elected president of the West Virginia State Society.

Other new officers include William

**Mr. Pitsenberger**

D. Nickels, Fairmont, W. Va., first vice president; John R. Martin, Wellsburg, W. Va., second vice president; Ross B. Johnston, Charleston, W. Va., and James V. Karrick, Charleston, W. Va., treasurer.

Pitsenberger succeeds Royal C. Bundy as State president.

***News Gets Stale . . .***
***Stale News Isn't Printed . . .***
***SO*—Stories and photos for the *American Engineer* about outstanding chapter or state society events should be submitted *immediately after the events take place.***
**Even better — *advance stories* whenever possible.**

By Mrs. Warner Howe, Chairman of the Ladies Auxiliaries Advisory Committee.

ACTIVITIES AND PROMOTIONAL projects during Engineers' Week offer an excellent opportunity for service by auxiliaries to their parent chapters. Some auxiliaries add materially to the men's efforts. The Auxiliary to the Canton Chapter of the Ohio SPE decorates for the dinner held during this week; the Auxiliary to the Bexar Chapter of the Texas SPE has been very active in assisting their engineer husbands at this time of the year; in Connecticut the auxiliaries try to have a speaker in all secondary schools in the State. The men explain the necessary preparation for being a professional engineer, urge those who are interested and have the necessary grades to enter the profession. (Mrs. Julian F. Abele, 1241 Long Hill Road, Cheshire, Conn., present State secretary has been in charge of this project.)

IN ADDITION TO THE POSSIbility of helping the parent chapter during Engineers' Week, there are many useful and interesting projects. One such endeavor is mentioned by Mrs. Earl C. Chambers, secretary of the Ladies Auxiliary of the South Piedmont Chapter of the North Carolina SPE: "The Children's Nature Museum here depends to a great extent on volunteer help to keep it going, though it does have a small paid staff. It is a fine educational facility, available without cost to children in schools and after school. Our contribution has been to address the approximately eight hundred bulletins which go out monthly to individuals and teachers interested in the Museum's programs. We take turns at the job which requires two members about five hours time each per month." This Auxiliary also gives a scholarship grant of $100 to a student in engineering at N.C. State College in Raleigh, N. C.

*(Continued on page 59)*

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## Rhinehart

(*Continued from page 54*)

tion through automation to produce more and better materials for defense, as well as items to raise the living standards of our people. If we continue our superiority in these things," he said, "we need not fear a direct attack from anyone. If we continue our superiority, the other nations will look to us for guidance. If we do nothing we can expect defeat."

He outlined to the engineers and architects at this meeting some of the philosophies of the engineering profession, and stressed the importance of professional societies in the life of a professional man. He also discussed registration and NSPE.

In all of his talks to the engineers of the Zone and to the Registration Board, Pres. Rhinehart advised them to seek registration by examination.

One of the highlights of his visit was an hour talk with William E. Potter, governor of the Canal Zone, and not too long after the NSPE's president departure from the Zone an unusual event took place when Gov. Potter was presented his certificate of registration as a professional engineer. Under authority of Public Law 674, 84th Congress, 2nd Session, Gov. Potter established the regulations governing the practice of architecture and engineering in the Canal Zone. Gov. Potter was granted registration under the "eminence clause" of the Canal Zone registration regulations.

Prior to World War II the governor had been officer-in-charge of the Nicaraguan Canal Survey; chief concrete technician, Montgomery Dam; officer-in-charge of construction, Tygart Dam and officer-in-charge of construction, Emsworth Dam. During World War II, General Potter served as assistant G-4 (plans and operations). After World War II he was successively district engineer at the Alaska and Kansas City Districts; assistant chief of engineers for Civil Works, Department of the Army; and division engineer, Missouri River Division.

The Canal Zone Board of Registration for Architects and Professional Engineers, the youngest registration body of the United States and her Territories, recently became a member of both the National Council of Architectural Registration Boards and the National Council of State Boards of Engineering Examiners.

## *Admiral Chas. R. Will Talks On Civil Defense*

Admiral Chas. R. Will, director of civil defense, Montgomery County, Pennsylvania, was the featured speaker at the January meeting of the Valley Forge Chapter of the Pennsylvania SPE. Admiral Will's topic was "The Latest on Civil Defense." He also showed a motion picture.

Preceding the talk, the 1957 officers of the Chapter were installed. John D. Fridy, Collegeville, Pa., was installed as president succeeding Harold Curll, Norristown, Pa. Other officers installed were Adolph Hopf, Dublin, Pa., vice president; Russell R. Greulich, Lansdale, Pa., executive secretary, and Edw. A. Seiz, Lansdale, Pa., treasurer.

## *New York Chapter Hears Talk By General Israel*

"Air Defense and Integration Into Sage" was the subject spoken on by Brig. General Robert S. Israel, Jr., at the January meeting of the Central New York Chapter of the New York State SPE.

Brig. General Israel is the division commander of the 32nd Air Division, Syracuse Air Force Station.

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## Auxiliaries

(*Continued from page 55*)

MRS. CHAMBERS EXPRESSES well the attitude of her Auxiliary toward the requirements of any project that her Auxiliary would assume. She says, "Any project which our Auxiliary would undertake must pass several requirements. First, it must have some connection with the aims of our organization. Second, it must be approved by the men's group. Third, it must not require financing beyond a sum we can raise ourselves. Fourth, it must not be too time-consuming."

THE FOLLOWING AUXILIARies are not included in the 1956 *Engineers' Wives:* (If your Auxiliary is not included in this list or the 1956 *Engineers' Wives* please send the name of your Auxiliary, the names and addresses of both your president and secretary, and the year that you were organized to NSPE headquarters. Address in front of this magazine.) New Jersey, Mercer Chapter—president, Mrs. Merton S. Adams; Pennsylvania, Buck County Chapter; Georgia, Southwest Chapter—1955 president, Mrs. H. P. Derry; South Carolina, Piedmont Chapter—president, Mrs. Holmes Frederick; South Carolina, Columbia Chapter—president, Mrs. Marcus Durlach, Jr.; Tennessee, Nashville Chapter—president, Mrs. Arthur Crouch; West Virginia, Charleston Chapter—president, Mrs. Harry G. Kennedy; Kansas, Smoky Valley Chapter—president, Mrs. Paul S. Wall, and Kansas, Topeka Chapter—president, Mrs. Abram Pratt.

THE COLUMBIA CHAPTER OF the South Carolina SPE gained an Auxiliary in December and the following officers were elected: president, Mrs. Marcus Durlach, Jr.; first vice-president, Mrs. Richard Donovan; second vice-president, Mrs. Gene King; recording secretary, Mrs. T. H. Watson; corresponding secretary, Mrs. Janus DeHamer; treasurer, Mrs. William O'Neal. On December 14 this new Auxiliary held a joint meeting at the Columbia Museum of Art.

## *Texas Chapter Takes 'Architectural Tour'*

Members of the Pineywoods Chapter of the Texas SPE were taken on an architectural tour of the Mediterranean countries and Europe during a recent meeting. Rev. W. Kirk Allen, Jr., pastor of the First Presbyterian Church of Lufkin, showed a series of color slides and reported on structures of architectural interest that he saw while on a visit to the Mediterranean and Europe.

Recently installed as president of the Chapter was Fred Griffin. C. P. Summers was installed as vice president; Loren R. Odle, secretary-treasurer; Ed Wareing, state director; Joe W. Beckham, librarian, and Herman Vandeman, A. T. Muckleroy, and J. M. York, directors.

President Griffin announced the following chapter committee appointments: Chapter Activities Committee—Frank Stevenson, chairman, and Dale Culwell; Membership Committee—Rufus Duncan, chairman, Cecil Simpson, and E. M. Tate; Public Relations Committee—John Cluck, chairman, Staley Mims, W. A. Thompson, and J. M. York; Law and Ethics Committee—Bill Stockton, chairman, B. J. Terrell, and J. O. Booker; Student Advisory Committee—Wayne DeBenke, chairman, Bill Woodward, and Sam Sayers.

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# STRICTLY BUSINESS

***Personalities . . .*** The **Spring Division** of **Eaton Manufacturing Company,** Detroit, Mich., announces the appointment of **George L. Radamaker** as chief engineer of the leaf spring department. . . . **Donald C. McDonald** has been named director of engineering of the **Friez Instrument Division** of **Bendix Aviation Corporation,** a new position in the company, according to **Leroy D. Kiley,** division general manager. . . . **C. Dean Ramsden** has been appointed vice president and general manager of **Pacific Coast Engineering Company, Alameda, Calif.** . . . The appointment of **Herbert G. Haussig** to the engineering staff of **Johnston and Funk Titanium Corporation,** Wooster, Ohio, has been announced by **J. H. Johnston,** chairman of the board. . . . **E. Warren Bowden** has been elected executive vice president of **Walter Kidde Constructors, Inc.,** engineers and builders of New York and Houston. . . . Appointment of **Alan R. Pearlman** as chief engineer has been made by **Universal Atomics Corp.,** Westbury, L. I., New York. . . . **John P. Finley** has begun work as a general foreman in the porcelain enameling department for the **Maytag Company,** Newton, Iowa, assuming the ceramic engineering duties in that department. . . . **The Hinchman Corporation,** consulting engineers of Detroit, Mich., have announced that **Dr. C. G. Duncombe** has become affiliated with the firm as a consulting engineer and has become a member of its board of directors.

Mr. Radamaker

**Paul L. Layton** has been appointed national aircraft engineering representative for the **Textile Products Division** of **Owens-Corning Fiberglass,** it has been announced by **William M. Keller,** vice president and divisional sales manager. . . . The promotion of **Frederick M. Rutledge** to manager of project engineering of **The Hays Corporation,** Michigan City, Ind., has been announced by **Phil Sprague, Jr.,** executive vice president of the company. . . . **Donald C. Mills,** formerly senior design engineer on magnetic air circuit breakers for the **Pacific Switchgear Division,** has been named manager of development engineering for the **Eastern Switchgear Division, Federal Pacific Electric Company,** Scranton, Pa. . . . **Patchen and Zimmerman,** engineers of Augusta and Atlanta, Ga., announce the appointment of **Moses Eugene Cox** as a special representative in their Atlanta office. . . . **Lewis P. Naylor** has been named director of product development for the **Ozalid Division** of **General Aniline & Film Corporation.** . . . **W. T. Rison,** manager of the **Replacement Division** of **Thompson Products, Inc.,** Cleveland, Ohio, announces the appointment of **A. Kenneth Hannum** to the position of chief engineer of the division.

Mr. Mills

The election of **F. L. Griffith** and **F. W. Blanchard** as vice presidents of **Hewitt-Robins, Inc.,** Stamford, Conn., has been announced by **Thomas Robins, Jr.,** president. . . . **Melco Products, Inc.,** Minneapolis, Minn., has named **William J. Field** as director of engineering. . . . **N. Henry Gellert,** Seattle engineering executive, has been elected to membership on the Advisory Council of the **American Gas Association.** . . . **Richard H. Frost,** president, **National Pneumatic Company, Inc.,** and **Holtzer-Cabot Divisions,** announces the appointment of **Eldred P. Codling** as chief engineer of the **National Pneumatic Co., Inc.,** Boston, Mass. . . . **Meyer L. Sugarman** has been appointed director of Electro Photographic Research for the **American Photocopy Equipment Company,** Chicago, Ill. . . . **Dr. Belas K. Erdoss** has been elected president of **The Korfund Company, Inc.,** Long Island City, N. Y. . . . **John W. Cosier** has been named chief product engineer of **The Pfaudler Company,** Rochester, N. Y., according to **Mercer Brugler,** president. . . . **Richard T. Fling,** a mechanical engineer of the staff of **Superior Tube Company,** Norristown, Pa., has been appointed supervisor of the firm's newly-created Aperture Mask Department. . . . The board of directors of **General Foods Corporation,** White Plains, N. Y., has elected **Elmer J. Grimmett** vice president for manufacturing and engineering. . . . **Chester W. Cambell** has been appointed president of **The Foundation Company,** New York, N. Y. . . . **Samuel D. Kapelson** has been named vice president in charge of sales and engineering of **Grand Iron Works, Inc.,** New York, N. Y., according to **Bernard E. Alpern,** president. . . . Two management changes in **Reserve Mining Company** have been announced by **W. M. Kelley,** president. **C. L. Kingsbury** is retiring from active business and has resigned as vice president of **Reserve. J. William Bryant,** who will assume **Kingsbury**'s duties, has been elected as a vice president. In his retirement, **Kingsbury** will continue in a consulting capacity to **Armco Steel Corporation,** a joint owner of **Reserve.**

Mr. Codling

***Expansion . . .*** To expand its production of precision equipment for optical tooling, **Keuffel & Esser Company** is opening a new factory at Cranford, N. J., **Carl W. Keuffel,** president, has announced. The Cranford plant, expected to go into production this month, will be the sixth factory that **Keuffel & Esser** has added to its manufacturing facilities during the last few years. . . . A modern $2-million manufacturing plant has recently been opened by the **Bridgeport Thermostat Division** of **Robertshaw-Fulton Controls Company.** The 180,000-square-foot plant is located in Milford, Conn.

***Partnership . . .*** **Slaughter, Saville & Blackburn,** industrial engineering consultants of Richmond, Va., and **Brown & Blauvelt,** New York civil engineering firm, announce the formation of the professional partnership of **Blackburn, Brown & Blauvelt of Richmond.**

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*General Electric gives you what you need to know about the nuclear applications of your field.*

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Comprehensive employee benefit program

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Periodic merit reviews

Civil engineers have new horizons today. Act now to assure yourself the kind of future you've always wanted—in a field that is changing the course of aviation history.

*Send your resume in confidence, stating salary requirements, to location you prefer:*

GENERAL ELECTRIC

J. R. Rosselot
P. O. Box 132
Cincinnati, Ohio

L. A. Munther
P. O. Box 535
Idaho Falls, Idaho

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**Minimum 3 lines.**
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### Positions Wanted

Registered Consulting Petroleum Engineer, 25 years experience in Gulf Coast and foreign fields, specializing in production problems, well completions, gas lift installations and operation, desires a consulting account in Harris County, Texas. Write to Box 201, AMERICAN ENGINEER.

Licensed Professional Engineer—Over 20 years experience in many fields, including design, construction, plant layout, housing development. Desires connection with Engineering or Manufacturing Firm. Prefer New York Area or Florida. Will make investment if needed. Box 202, AMERICAN ENGINEER.

REGISTERED ENGINEER, 39, self employed 11 years. Experienced in surveying, design for streets, sewers, drainage, etc. Will consider salaried position. Willing to study for advanced degree or study other fields of engineering or management. Write to Box 203, AMERICAN ENGINEER.

Mechanical Engineer, P.E., Experience in Power Plant Operation. Start-up, trouble-shooting and thermal calculations. Desire career position with management potential combing field and staff engineering. Write Box 204, AMERICAN ENGINEER.

**AMERICAN ENGINEER**
**CLASSIFIED ADS**
**Reach over 40,000 RPE's**

## Letters

*(Continued from page 4)*

Could it be due to the fact that sometimes necessary items of work are overlooked by the contractor and/or by the engineer when the contract is let? Engineering plans are never perfect, of course; but today imperfections cost much more to rectify. Years ago, a contractor would fill in the missing items without even thinking about it unless they were very large items. Today this is difficult to do. The ever-rising costs of labor make it impractical to perfect defections in design for free. A contractor will not stay in business very long if he does. More often than not, corrections of design during construction require much more labor (including personnel all the way up to the president of the company.)

To offset this ever-increasing condition, the engineer must spend far more time on details which were originally worried about by the contractor. Since the engineer now must set down on drawings and add words of specification type what used to be inferred by the type of design, he necessarily is doing far more repetitive and time-consuming work on a job which once required little more than an idea to be conveyed from the engineer to the contractor. Years ago, the details of construction were well known and easily taken care of by the contractor and his company of superintendents, foremen, craftsmen, and laborers.

Today, the engineer must have many draftsmen, secretaries, and other miscellaneous technicians to assist him in his design job. Unless he does, he will have to do all the drawing, letter-writing, file reference for those heretofore omitted items which were inferred but not specifically described in a project. To a degree, the laborer is moving into the office to fill its ever increasing demand.

Engineers will require foremen to maintain and direct their ever-growing factory of personnel. He will become more and more an executive and less and less an engineer. New ideas for design do not readily come from the executive engineer. The engineer of yesterday was given a job which he developed into a practical and economical design easily recognizable to a contractor who worked out the "minor" details during the course of the job.

Today, it is economically unfeasible for a foreman to work out "minor" details while his men wait. The lesser knowledge of the laborer and foremen today undoubtedly contribute to this unfortunate situation.

Is this evolution of engineering, and of construction, for the best? I wonder.

ROBERT HODGINS, *EIT*,
San Diego, Calif.

## ENGINEER FOR TOWN MANAGER WANTED

**POSITION AVAILABLE:** Town Manager, Elkton, Virginia, population about 1500.

**DUTIES:** Manage general affairs of the Town including water and power distribution to 600 customers, sewer system and disposal plant and supervise Treasurer and four man Police Department. Prepare budgets, estimates and reports. Supervise 14 employees.

**QUALIFICATIONS:** Engineering background including experience in 2300 volt power distribution and administrative duties. Prefer active man about 55 desiring to live in a rural and pleasant community.

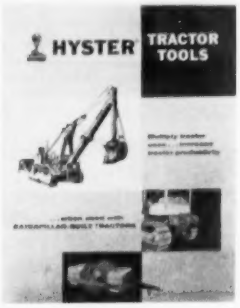
**SALARY & BENEFITS:** A good salary, two weeks vacation, 8 holidays, health insurance and expenses allowed for conventions and meetings.

**MAKE APPLICATION TO:** Mr. W. J. Anthony, P. O. Box 367, Elkton, Virginia.

# . . . NEW LITERATURE . . .

***To help the offering firms determine which literature you require, when requesting an item, be sure to list all specifications shown . . . and say you saw it in the AMERICAN ENGINEER.***

**TRACTOR ATTACHMENTS**—How addition of the right tractor job attachment increases production and profit on virtually all types of construction and logging operations is covered in an informative 8-page catalog offered by Hyster Company. All Hyster tractor job attachments offer the advantage of Caterpillar-built tractor mobility and maneuverability combined




with the extensive power of Caterpillar diesel engines. The catalog can be obtained by contacting any Caterpillar-Hyster dealer or writing Hyster Company, 2902 N. E. Clackamas St., Portland 8, Ore.

—AE—

**DIGITAL COMPUTER**—A 6-page illustrated bulletin describing the Bendix G-15D general purpose digital Computer and its digital differential analyzer accessory, is now available. The versatility and range of operations of the basic Bendix G-15D is considerably increased by the addition of this optional accessory. Linear and non-linear differential equations are solved accurately and rapidly with the two units. New programming techniques and a complete new line of input and output equipment are also described. Copies will be mailed on request. Write Bendix Computer Division, Bendix Aviation Corp., 5630 Arbor Vitae St., Los Angeles 45, Calif.

—AE—

**MOVABLE WALLS**—The complete line of Mills Movable Metal Walls, including a new series of aluminum partitions based on an entirely new concept in modular integration of movable interiors, is covered in the 1957 Mills Walls Catalog. The new series, called Milluminum Partitions, is presented as an example of the developments being achieved by Mills' research program on modular movable interiors. Brief copy describes the series, including four pages of perspective drawings. Separate sections of the easy-to-read 68-page catalog feature the other three types of Mills Walls—Flush Pilaster, New Executive and Commercial. Illustrative content embraces more than 50 photographs of typical Mills installations in commercial, industrial and public buildings, laboratories, schools and universities, and non-residential structures of every type. Copies of the catalog may be obtained without obligation by writing to the Mills Company, 993 Wayside Rd., Cleveland 10, Ohio.

**INSTALLATION PRACTICES**—A new illustrated booklet on installation practices for General Electric interlocked armor cable systems has been announced by the company's Wire and Cable Department. The 36-page booklet is devoted to photographs showing terminations and splices; connections to switchgear, motors and plug-in bus; special installation problems; typical installation; and "before" and "after" illustrations showing the older wiring system side by side with the new interlocked armor cable system. These photographs have been selected and reproduced to assist electrical contractors and industrial engineers with appl' ation problems when installing interloc' armour cable. The booklet, publication No. 19-606, is available without charge from GE in Bridgeport, Conn.

—AE—

**COMBUSTION CONTROLS**—A new catalog on Combustion Controls and Instruments, representing a single source of information covering a complete line of automatic controls and instruments for the combustion industry, is offered by General Controls Co. The informative catalog covers everything required for a complete combustion installation such as automatic draft control instruments and actuators; solenoid, diaphragm and motor-operated valves for oil, gas, steam and water; time switches, relays and oil burner primary controls. The manufacturer states that this is the first time a complete and standardized line of combustion instruments and controls has been cataloged under one cover. Catalogs are offered free on request by writing General Controls Co., 801 Allen Avenue, Glendale 1, Calif.

—AE—

**DUST CONTROL**—A new bulletin issued by The Johnson-March Corp., Philadelphia, tells how cement plants can suppress dust at its source before it can rise in the atmosphere. It shows, by copy and illustration, how to achieve dust-free handling of rock, coal and clinker at truck dumps, crushers, screens, bucket elevators, conveyor transfer points, and at boat loading and unloading docks. Advantages of the system, known as Chem-Jet, are outlined with an explanation of how it works. Details are given about the essential equipment and Compound M-R surface active agent used with the system. Additional facts are also offered concerning a new hydro-precipitator scrubber designed for removal of low micron dust particles.

—AE—

**CONTROLS OF LIQUIDS AND GASES**—A greatly revised edition of the Simplex general catalog of measuring and control equipment has been prepared by the Simplex Valve & Meter Company, Lancaster, Pa. This practical booklet supersedes an earlier volume produced in 1953. Brought up-to-date and completely revised, it presents a compilation of 36 information-packed pages, all valuable to operating and supervisory plant personnel. Bulletin 005 lists all major Simplex equipment for the measurement and control of liquids and gases.

**DESIGN MANUAL**—A new concept in design manuals has been developed by the Perlite Institute, which is offering architects and engineers an 80-page volume containing all related specifications, data and detailed drawings for complete roof and floor systems, curtain wall back-up, and other building sections. The manual, bound in handy loose-leaf form, includes all data required for designing and specifying the various components of a complete building section without restricting

the architect's or engineer's freedom to make special adaptations. Additional copies of each of the 18 different specification and data units are available for use by architects' and engineers' representatives on the construction site and for distribution to contractors preparing bids. Copies of the manual may be obtained from members of the Perlite Institute, or through the Perlite Institute, 45 West 45th St., New York 36, N. Y.

—AE—

**REVISED REFERENCE**—A newly revised edition of the valuable reference work, "Guide for Selecting Valves, Boiler Mountings, Lubricating Devices" has been published by the Lunkenheimer Co. of Cincinnati, Ohio. New sections, describing revolutionary new LQ600 Bronze Globe Valves, with Brinalloy Seats and Discs; Luncor PVC All-Molded Valves, which are completely resistant to industrial chemicals; and Lunkenheimer Solder End Valves have been added to the 24 pages of tables, technical data and information on the selection of valves, boiler mountings, and lubricating devices. Completely indexed for easy reference, it is identified as Circular No. 555, Valves (A.I.A. File No. 34). The new edition of Circular No. 555 is available, on request, from the Lunkenheimer Co., Cincinnati 14, Ohio.

—AE—

**MOLDED RUBBER PARTS**—A new brochure on custom-molded rubber parts is being offered by the Tyer Rubber Company of Andover, Mass. The various creative phases covered in the eight-page pamphlet include: engineering consultation, compound selection, mold design and manufacture. Technical specifications include a description of the relative properties of natural and synthetic rubbers. For free copy, write: Tyer Rubber Company, Molded Rubber Products Division, Andover, Mass.

***These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims.***

# What's New

**AMERICAN ENGINEER** February, 1957
**2029 K STREET, N. W., WASHINGTON 6, D. C.**

Please send information on Item 1 to:

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## SMALL TV CAMERA — Item 1

A streamlined miniature TV camera, small enough to be held in the palm of the hand, is expected to aid industry and science. The camera, which comes equipped with a variety of lenses and mirror attachments, measures only 5¼" long, and 2" in diameter. Tiny spring mounted wheels enable the camera to examine remote, cramped locations such as the inside of small tubes or boilers. A built-in-light source eliminates lighting problems for dark areas. The camera can be moved back and forth in cramped spaces.

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**AMERICAN ENGINEER** February, 1957
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Please send information on Item 2 to:

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## TOOL FOR REMOVING CASTINGS — Item 2

The Osborn Manufacturing Corporation announces the addition of the "SPRUEMASTER" to their line of industrial safety equipment. This tool for removing castings from die casting machines is made of a high tensile aluminum alloy which being light weight eliminates approximately 50 per cent of surplus weight the operator must handle, resulting in less operator fatigue and increased efficiency. Made in various lengths, the "SPRUEMASTER" is designed so that the cone shaped head will fit a wide range of sizes.

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Please send information on Item 3 to:

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## ADJUSTABLE HOLE GAGE — Item 3

The Kwik-Chek hole gage, a new precision tool manufactured by the Allied Products Division, Hamilton Watch Company, permits rapid and highly accurate measurement of small hole diameters. Accuracy and readability of the gage is 0.0005"—the direct reading scale being marked in increments of 0.001", and equipped with a 2½X magnifying lens. Simplicity typifies both the construction and operation of the gage. The gages are useful to those concerned with precision hole diameter measurements.

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**AMERICAN ENGINEER** February, 1957
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Please send information on Item 4 to:

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## TUBULAR HEATER SEAL — Item 4

A new tubular heater seal, suitable for economical application to both industrial equipment and domestic appliances, has been announced by the General Electric Company's Industrial Heating Department. The sealing material is a special plastic resin used in conjunction with a ceramic bead. A shoulder on the bead controls the creepage distance from the terminal to the sheath, without adding to the dimensions of the heater, according to GE engineers. The new seal is available on all sizes of tubular heaters for temperatures up to 300 F.

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**AMERICAN ENGINEER** February, 1957
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## SELF-LOCKING SCREWS, BOLTS — Item 5

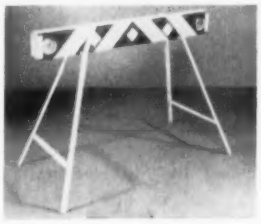
Airframe, engine and aeronautical components builders will no longer have to secure screwed and bolted connections with lock wire, thanks to a new military specification just issued by the Aeronautical Standards Group, it has been announced by The Nylock Corporation. The specification, MIL-F-18240, covers self-locking elements for use on externally threaded fasteners in the temperature range up to 250°F.

**This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.**

***These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.***

## FLASHING LIGHT-BARRICADE — Item 6

"Six Months Bright" is the feat of new, complete OWL-LITE Flashing Light Road Barricades, a combination job protection unit manufactured by Partronics, Inc. OWL-LITE flashing red warning or amber caution lights employ a new electronic circuit principle. There are no thermal or mechanical parts to be affected by severe weather conditions, jarring or upsets. An average of 100 flashes per minute, plus bright light intensity is maintained throughout the life of the battery. The new light is visible for a distance of over one mile.



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## INSIDE WATER COOLING TOWER — Item 7

A new product in the Industrial Refrigeration field is an all metal Water Cooling Tower that may be installed inside of the plant. Produced by the Lundholm Manufacturing Company, this new tower is constructed of light-weight steel and aluminum, with over-all dimensions on the 2-ton capacity tower of—length 34½ inches, width 27 inches, and height 41 inches. Because of the compactness of the Tower, installation inside of the building may be utilized. Where floor space is at a premium, overhead suspension above the machine is recommended. The Tower can save up to 90 per cent on water consumption.

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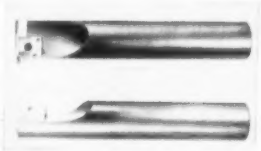
## EVEREDE BORING BAR — Item 8

Everede Tool Company announces that it has successfully designed and thoroughly tested a new boring bar, for use on turret lathes, boring mill, etc., that incorporates the Everede triangular shaped tool-bit with the added advantage of positive chip control. Chip control is achieved by using another recent Everede development, a solid carbide chip breaker that is claimed to be infinitely adjustable. An adjusting set screw behind chip breaker permits quicker, easier adjustments "on the job" for various feeds and depths of cut, reduces tool-bit breakage and increases tool-bit life.



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## COMPOUND FOR SANITARY CONCRETE FLOORS — Item 9

An easy-to-apply compound for new or old concrete floors that meets heavy traffic demands of industry and contains an antibacterial ingredient that meets the most exacting sanitary requirements of food and dairy plants has recently been developed by Maintenance Engineering. The product, called Super-Patch, prevents disintegration of floors by inhibiting molds and fungi and it effectively controls odors. It is used for patching or repairing worn or disintegrated floors and it can be used also as an armor for the topping of new concrete floors.

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## ALUMINUM INDUSTRIAL WHEEL — Item 10

A new aluminum industrial wheel for systems in continuous operation, incorporating a DuPont Neoprene tire, has been introduced by the manufacturer, R & K Industrial Products Co. The R & K Loadmaster wheel solves the problem of increasing load capacity without sacrificing rollability. And, through the designed use of Neoprene, resists the usual deterioration caused by animal fats, oils, greases, acids, brines, etc., as well as abrasion, cutting and chipping. The Loadmaster also resists sunlight and ozone, heat and cold, and permanent deformation under load.

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Please send information on Item 10 to:

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## Engineers' Week

(*Continued from page 40*)

A new feature for this year's Week is the availability of a 29-minute color film. This film, the "American Engineer," was made by the Jam Handy Organization and takes the form of a photographic trip to outstanding American engineering achievements. Through special arrangements with Jam Handy the film may be reserved, at no charge, by all NSPE groups for showing during National Engineers' Week. Nearly 200 reservations for the film were made as this issue went to press.

The National Engineers' Week Committee reports a considerable interest in the theme for the 1957 observance—"Engineering . . . America's Great Resource." This theme was chosen on the basis of the growing belief that the country's real resources are not buried in the crust of the earth, but are actually walking around about six feet above ground, in the minds and attitudes of the people.

***P.E. PUBLICITY CHAIRMEN***

***YOU have a date for FEBRUARY 25th!***

That's the time to send your Engineers' Week story to the *American Engineer*.

As usual, space will be limited but we will give as wide coverage as possible. So get the news of the week's outstanding events in the mail EARLY.

***FEBRUARY 25th is the day to do it!***

The 1957 poster has been used in a variety of ways for exhibits and window displays. The picture on page 40 shows how the basic elements of the poster design can be expanded into a large display.

All local Engineers' Week committee chairmen are reminded that complete reports on their chapter activities should be sent to the National Society office as soon as possible after the Week is over. These reports are studied by the National Engineers' Week Committee as a source of ideas for the next year's program. All reports are kept on file in the NSPE headquarters for one year after the conclusion of the Week. They should include newspaper and magazine clippings, photographs of exhibits, listings of radio and TV programs for which public service time was obtained, and any other information concerning the promotional efforts for the Week.

John L. Bahr, National Engineers' Week Chairman, has urged that all local chairmen fill out the questionnaire concerning the Week as soon as possible. The questionnaire will be sent to each local chapter and will ask for opinions about the promotional material furnished by the National Society.

"We want National Engineers' Week to be a growing thing each year," Mr. Bahr stated. He added that "the information obtained from these questionnaires enables us to plan for a better and more varied Week."

The questionnaires will be mailed during the latter part of February.

### FEBRUARY MEETINGS OF NOTE

**American Society for Testing Materials**—National Meeting and Committee Week, February 4-8, Benjamin Franklin Hotel, Philadelphia, Pa.

**Society of the Plastics Industry**—Annual Reinforced Plastics Division Conference, February 5-7, Edgewater Beach Hotel, Chicago, Ill.

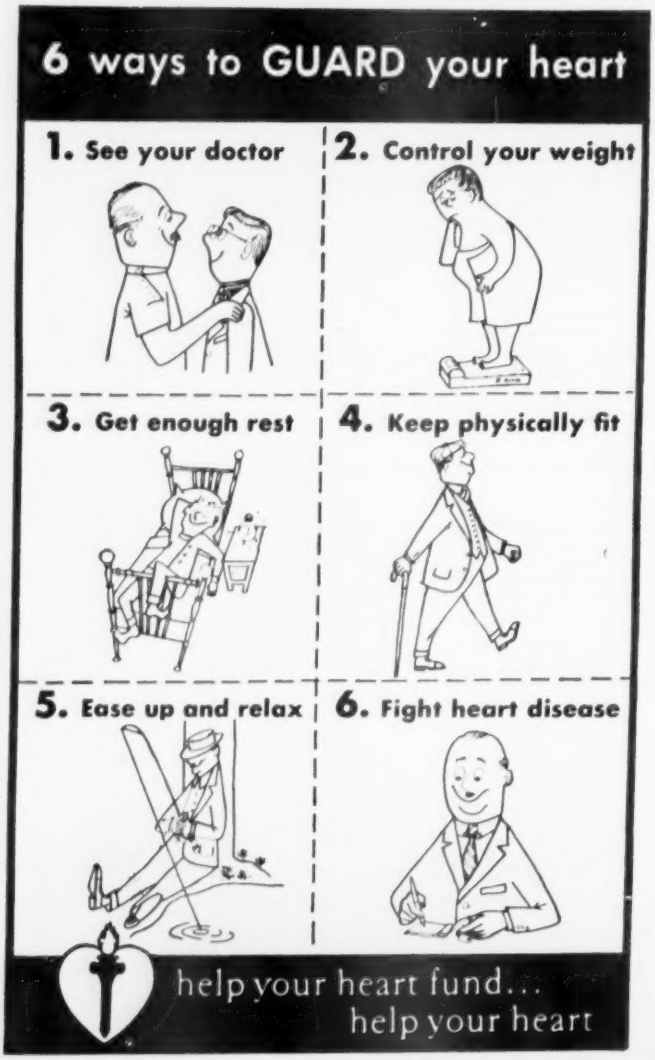
**Audio Engineering Society**—Annual West Coast Convention, February 7-8, Ambassador Hotel, Los Angeles, Calif.

**American Management Association**—Conference on "Managing the Atom," February 7-9, Hotel Statler, New York, N. Y.

**American Institute of Mining Engineers**—Annual Meeting, February 24-28, Roosevelt and Jung Hotels, New Orleans, La.

**American Society of Heating and Air-Conditioning Engineers**—Annual Meeting, February 25-28, Conrad Hilton Hotel, Chicago, Ill.

**Institute of Radio Engineers; American Institute of Electrical Engineers; Association for Computing Machinery**—Western Joint Computer Conference, February 26-28, Statler Hotel, Los Angeles, Calif.


6 ways to GUARD your heart
1. See your doctor
2. Control your weight
3. Get enough rest
4. Keep physically fit
5. Ease up and relax
6. Fight heart disease
help your heart fund...
help your heart

# American Engineer

# Readers' Service Department

## Here's How Busy Engineers Can Keep Up-to-Date . . .

Registered, professional engineers *are* busy people but their careers demand that they "stay on top" regarding new products and new developments. We hope that our new READERS' SERVICE DEPARTMENT will help our more than 42,000 readers do just that.

### HOW WILL IT WORK?

It's easy. You will notice that each advertisement in this issue makes reference to a number used on the card below. If you want more information about any ad simply circle the corresponding number on the card and MAIL PROMPTLY! Read the ads in this issue NOW and then complete the card below and drop in the mail. The information you want will be on its way to you within a matter of days.

### TODAY'S TECHNOLOGY MOVES FAST—KEEP INFORMED

AMERICAN ENGINEER
2029 K Street, N.W.
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| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

Additional Remarks: .....

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My Name ..... Title .....

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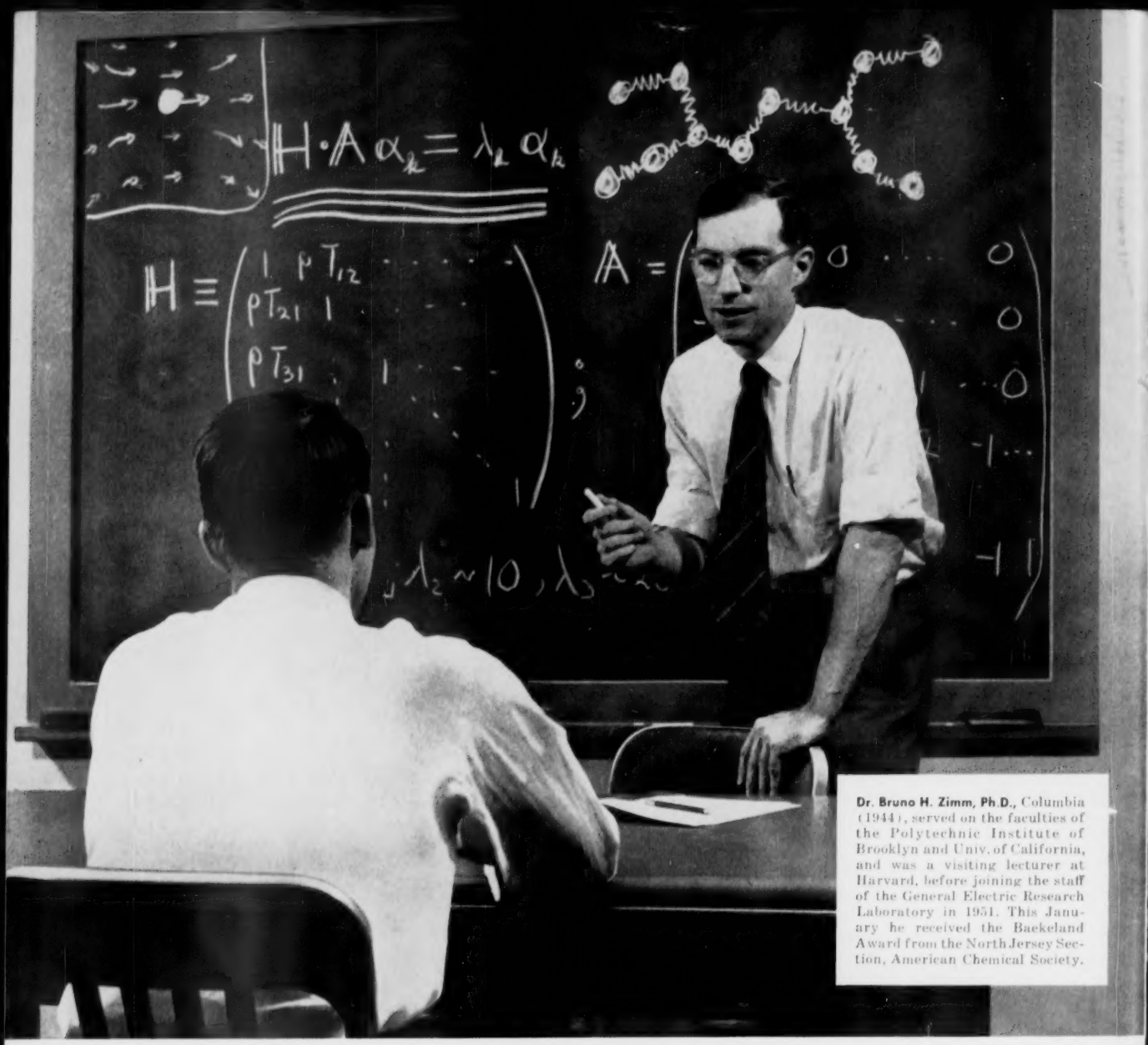

**Dr. Bruno H. Zimm, Ph.D.,** Columbia (1944), served on the faculties of the Polytechnic Institute of Brooklyn and Univ. of California, and was a visiting lecturer at Harvard, before joining the staff of the General Electric Research Laboratory in 1951. This January he received the Baekeland Award from the North Jersey Section, American Chemical Society.

# Learning more about molecules

## General Electric's Dr. Bruno H. Zimm attacks the problems of polymer chemistry both as theoretician and experimentalist

The *weight* of molecules is more easily determined than their *size* and *shape*, but an understanding of these latter properties is equally essential in the designing of plastic materials.

At the General Electric Research Laboratory, Dr. Bruno H. Zimm and his associates are using the most recent techniques for studying molecules by projecting light beams through polymer solutions. How the light is scattered, its intensity at various angles, and similar observations have been related to the shape and dynamic properties of polymer molecules and thus to the eventual characteristics of plastic materials: strength, insulating properties, and flexibility.

For such experimental work, and for theoretical contributions to the understanding of how polymer chain molecules react when stress is applied, Dr. Zimm recently received the Baekeland Award of the American Chemical Society.

At General Electric, such research is motivated by a belief that providing scientists with the tools, the incentives, and the freedom to seek out new knowledge is the first step toward progress for everyone.

*Progress Is Our Most Important Product*

GENERAL ELECTRIC

*(Circle 27 on Inside Back Cover)*